No. 200200051

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

University of Arkansas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR CONDITIONING IT PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 AMENDED, 7 U.S.C. 2321 ET SEQ.)

RICE

'Ahrent'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-fourth day of November, in the year two thousand and four.

Attest:

Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
University of Arkansas Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
RU9901030

3. VARIETY NAME
Ahrent

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
AFLS Building Room E108
University of Arkansas
Fayetteville, AR 72701 USA

5. TELEPHONE *(Include area code)*
501-575-4446

6. FAX *(Include area code)*
501-575-2401

FOR OFFICIAL USE ONLY

PVPO NUMBER
20020005 11

FILING DATE
November 16, 2001

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Land Grant University

8. IF INCORPORATED, GIVE STATE OF INCORPORATION

9. DATE OF INCORPORATION

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Karen A. K. Moldenhauer
University of Arkansas RREC
~~P. O. Box 351~~ 2900 Hwy 130 E.
Stuttgart, AR 72160

FEES RECEIVED

FILING AND EXAMINATION FEES:
$ 2705-
DATE 11/16/01

CERTIFICATION FEE:
$ 432.00
DATE 10/14/04

11. TELEPHONE *(Include area code)*
870-673-2661

12. FAX *(Include area code)*
870-673-4315

13. E-MAIL
kmolden@uark.edu

14. CROP KIND *(Common Name)*
Rice

15. GENUS AND SPECIES NAME OF CROP
Oryza sativa L.

16. FAMILY NAME *(Botanical)*

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☒ NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

a. ☒ Exhibit A. Origin and Breeding History of the Variety
b. ☒ Exhibit B. Statement of Distinctness
c. ☒ Exhibit C. Objective Description of Variety
d. ☒ Exhibit D. Additional Description of the Variety *(Optional)*
e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
g. ☒ Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
☐ YES *(If "yes", answer items 20 and 21 below)* ☒ NO *(If "no", go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☐ YES ☐ NO
IF YES, WHICH CLASSES? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☐ NO
IF YES, SPECIFY THE NUMBER 1,2,3, *etc.* ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☒ YES Plan to apply for patent ☐ NO RAD 9/28/04
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER		SIGNATURE OF OWNER	
G. J. Weidemann			
NAME *(Please print or type)*		NAME *(Please print or type)*	
G. J. Weidemann			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
Director Ark. AES	11/16/01		

200200051

INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $2,705 ($320 filing fee and $2,385 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvp.htm

ITEM

8a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

8b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

8c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

8d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

8e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

21. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

22. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

Foundation grade seed of this variety was sold for the purpose of Registered grade seed production on March 6, 2001.

23. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

A plant utility patent application will be filed.

United States utility patent granted on April 27, 2004, patent no. 6,727,414.

RHP 9/28/04

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089. http://www.ams.usda.gov/lsg/seed/ls-sd.htm

S&T-470 (04-01) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (02-99) which is obsolete.

Exhibit A. Origin and Breeding History of the Variety

'Ahrent' originated from a recurrent selection program conducted at the Rice Research and Extension Center, Stuttgart, AR, in 1988, for increased sheath blight tolerance. The parentage for Ahrent involved the following cultivars: 'Vista', 'Nortai', 'Lemont', 'L-201', STG77M11697, 'Katy', 'Tebonnet', and 'Labelle'. 'Vista' (Jodon et. al., 1973) released in 1971, is a very-short season, medium-grain, with some blast resistance. 'Nortai' (Johnston et. al., 1973) is a midseason, short-grain, cultivar with good sheath blight tolerance which was released in 1972. 'Lemont' (Bollich et. al., 1985) is a high yielding, midseason, long-grain, semidwarf cultivar which is very susceptible to sheath blight, released in 1983. 'L-201' (Tseng et al., 1979) is a long-grain rice with sheath blight tolerance. STG77M11697 is from the cross CI9628//Northrose/Zenith; CI9628 is a medium-grain gold hulled selection from Rexoro//Lacrosse/Magnolia. 'Rexoro', 'Lacrosse' and 'Magnolia' have been described by Johnston (1958). 'Northrose', (Johnston et. a., 1965) released in 1962, is a short-season, medium-grain cultivar with some sheath blight tolerance. 'Zenith' (Johnston et. al., 1950) is a medium grain selection out of 'Blue Rose', with sheath blight tolerance released in 1936. 'Katy' (Moldenhauer et. al., 1990), released in 1989, is a blast resistant, midseason, long-grain rice cultivar with good sheath blight tolerance. 'Tebonnet' (Kuenzel et. al., 1985), released in 1984 is a short-season, long-grain rice cultivar with moderate sheath blight tolerance. 'Labelle' (Bollich et. al., 1973), is a very-short-season, long-grain cultivar which is very susceptible to sheath blight, released in 1972.

'Ahrent' originated from the C_3 cycle of the program as cross no.880427, made in 1988. During recurrent selection, S_o plants were screened for their tolerant disease reaction (disease scale 0 = no disease, 9 = maximum disease) to the pathogen *Rhizoctonia solani*, in inoculated field plots. Parents for each cycle of selection were the most tolerant S_o plants from the most tolerant crosses. Parents were those having a tolerant sheath rating of 1-3 indicating a reduced vertical disease progression relative to near-by susceptible plants, which rated a 6 or more. The plants were kept in families (by cross); selections were made within the families; and selected S_o plant were crossed between families in most cases.

The experimental designations for early evaluation of 'Ahrent' were STG92L03-042, starting with a bulk of S_4 seed from the 1992 panicle row L03-042. 'Ahrent' was tested in the Arkansas Rice Performance Trials (ARPT) during 1995, 1998 -2000 and the Cooperative Uniform Regional Rice Nursery (URRN) during 1994-1995, 1999-2000. It was tested as entry RU9401188 in 1994-1995 and RU9901030 1999-2000 (RU number indicated Cooperative Uniform Regional Rice Nursery; 94 or 99 indicates year entered; 01 indicates Stuttgart, AR; and 188 or 030 its entry number).

Table 1. Development of Ahrent

Year	Program Stage
2000	Arkansas Rice Performance Trials (5 loc) and URRN (4 loc) Foundation Seed field.
1999	Arkansas Rice Performance Trials (5 loc) and URRN (4 loc) 1000 Head rows Stuttgart Arkansas
1998	Arkansas Rice Performance Trials
1997	Reselected
1996	Arkansas Rice Performance Trials (5 loc) and URRN (4 loc) 1000 Head rows Stuttgart Arkansas
1995	Arkansas Rice Performance Trials (6 loc) and URRN (4 loc)
1994	URRN (4 loc)
1993	Preliminary Yield Test (1 locations)
1992	S_1 Panicle row (single row)
1991	S_2 Panicle row (single row)
1990-91 (winter)	S_3 Panicle row (single row), Puerto Rico
1990	S_4 field
1989	first generation in greenhouse, Stuttgart,AR
1988	Crossing (880427)

'Ahrent' appears to be uniform and stable in the F_{10} generation. For the last three years (S_9-S_{11}), head rows through foundation seed fields, 'Ahrent' has remained uniform and stable. Plants of 'Ahrent' have erect culms, green erect leaves, and glabrous lemma, palea, and leaf blades. The lemma and palea are straw colored with mainly purple colored apiculi, and some short tip awns may be present on the lemma at maturity under conditions of high fertility. The purple apiculi color often fades to brown color at maturity. Variants appear in 'Ahrent' at a frequency of about 1 per 5000 plants. The variants that may be found include any combination of the following: taller, shorter, earlier, later, glaborous or pubescent plants, as well as intermediate or very long slender grains and grains with long awns. These variants are identical to the variety in all other characteristics as described in Exhibit C.

Exhibit B - Statement of Distinctness

Ahrent is most similar to the variety Millie. Unlike Millie however, Ahrent is resistant to the blast races IB-49, IC-17, IG-1, and IH-1 with a greenhouse disease rating of 1 for each race. compared to the susceptible rating of 7 for each of these blast races on Millie (Crop Sci 31:229-230 and addition of Table 1b in disease section). Ahrent also has a smaller kernel size than Millie (Table 13). Individual milled kernel weights of 'Ahrent', 'Millie', 'Wells', 'LaGrue', 'Jefferson', and 'Cocodrie', averaged 16.7, 19.9, 18.5, 17.7,15.0,15.8,19.4, and 17.5, respectively.

Maturity: 'Ahrent' (RU9901030) is similar in maturity to 'Millie' and 'Cocodrie'.

Straw strength is an indicator of lodging resistance. 'Ahrent', like 'Millie', and 'Newbonnet', has greater straw strength than in 'Katy, or 'Kaybonnet'. On a relative straw strength scale (0 = very strong straw, 9 = very weak straw) 'Ahrent', Millie, 'Newbonnet', 'Katy', 'Kaybonnet', and 'Lemont' rated 3, 3, 4, 5, 5, and 1, respectively.

Plant height in 'Ahrent' is 100 cm which is approximately 10 cm shorter than 'Drew'.

Rough rice grain yields of 'Ahrent' have been consistent across locations in the Arkansas Rice Performance Trials (ARPT) being greater than 'Drew', 'Kaybonnet', 'Cypress' and 'Newbonnet' in all three years. In 15 ARPT tests (1998-2000), 'Ahrent', 'Wells', 'LaGrue', 'Kaybonnet', 'Drew', 'Jefferson', and 'Cocodrie' averaged yields of 8266, 8417, 8568, 7459, 7762, 7106, and 7913 kg ha^{-1} (120 g kg^{-1} (12%) moisture), respectively. Data from the URRN conducted at Arkansas, Louisiana, Mississippi, and Texas during 1999 - 2000 showed that 'Ahrent' average grain yields of 9022 kg ha^{-1} compared to the yields of 'Wells', 'LaGrue', 'Drew', 'Kaybonnet', 'Jefferson' and 'Cocodrie' at 10533, 10886, 9626, 9677, 8669 and 9979 kg ha^{-1}, respectively. Milling yields (mg g^{-1} whole kernel:mg g^{-1} total milled rice) at 120 mg g^{-1} moisture from the ARPT, 1998-2000 averaged 620:690, 590:720, 600:700, 610:700, 620:710, 550:690 and 650:710 for 'Ahrent', 'Wells', 'LaGrue', 'Kaybonnet', 'Drew', 'Jefferson', and 'Cocodrie', respectively. Milling yields for the URRN, 1999 - 2000, averaged 550:680, 540:710, 530:680, 560:690, 570:700, 540:690 and 610:700 for 'Ahrent', 'Wells', 'LaGrue', 'Kaybonnet', 'Drew', 'Jefferson' and 'Cocodrie', respectively.

Disease resistance. In greenhouse studies1994 -1996 conducted in Texas, 'Ahrent', like 'Katy', 'Kaybonnet', and 'Drew', is resistant to rice blast (*Pyricularia grisea* (Cooke) Sacc.) races IB-1, IB-45, IB-49, IB-54, IC-17, IE-1, IG-1, and IH-1, rating a 1, 1, 1, 1, 1, 1, 1, and 1, respectively, on a disease scale of 0 = immune, 9 = maximum disease. When considering all years through 2000, in greenhouse studies 'Ahrent', like 'Katy', 'Kaybonnet', and 'Drew', is resistant to rice blast (*Pyricularia grisea* (Cooke) Sacc.) races IB-1, IB-17 IB-45, IB-49, IB-54, IC-17, IE-1, IG-1, and IH-1, rating a 3,1, 1, 2, 0, 3, 1, 3, and 1, respectively, on a disease scale of 0 = immune, 9 = maximum disease. Like 'Katy', 'Kaybonnet', and 'Drew', 'Ahrent' is moderately susceptible to the blast races IB-33 and IE-1K, rating 7 and 7, respectively. 'Ahrent' is rated a MS-S to sheath blight (*Rhizoctonia solani* Kühn) which compares with 'Millie' (MS-S) 'Wells' (MS-S)

'LaGrue' (S), 'Drew' (MS), 'Kaybonnet' (MS), 'Jefferson' (MS), 'Cocodrie' (S-VS) and 'Cypress' (S-VS). Preliminary results show that 'Ahrent' is rated MR to kernel smut (*Tilletia barclayana* (Bref.) Sacc. & Syd. in Sacc.) which compares with 'Wells' (MR), 'LaGrue' (VS), 'Kaybonnet' (MS), 'Drew' (MS), 'Jefferson' (S), and 'Cocodrie' (VS). 'Ahrent' is rated MR to leaf smut (*Entyloma oryzae* Syd. & P. Syd.), R to brown spot (*Cochliobolus miyabeanus* (Ito & Kuribayashi in Ito) Drechs. ex Dastur), MS to narrow brown leaf spot (*Cercospora oryzae* Miyake), and MS to false smut (*Ustilaginoidea virens* (Cooke) Takah).

Insect resistance. 'Ahrent' like 'Wells', 'Newbonnet', and 'Cypress', appears to be very susceptible to discolored kernels caused by the rice stink bug (*Oebalus pugnax*).

Individual milled kernel weights of 'Ahrent', 'Wells', 'LaGrue', 'Kaybonnet', 'Drew', 'Jefferson', and 'Cocodrie', averaged 16.7, 18.5, 17.7,15.0,15.8,19.4, and 17.5, respectively, in the ARPT, 1999 - 2000.

Table 1. Summary leaf blast reactions in Ahrent and reference cultivars inoculated with races of *Pyricularia grisea* in greenhouse tests .

Cultivar	Test period	International Blast Race[a] IB-1	IB-33	IB-49	IB-54	IC-17	IE-1K	IG-1	IH-1
Ahrent	1994-1996	1	6-7	1	1	1	6-7	1-2	1-2
Kaybonnet	1994-1996	5-7	1	1	1	7-8	1	1	
Cypress	1994-1996	4-5	6	5-7	1	5-7	6-7	1	1
LaGrue	1994-1996	5-6	7-8	5-8	4-5	5-8	7-8	6-8	7
Ahrent	1998-2000	1-3	5-7	0-2	0	1-3	4-7	0	0
Drew	1998-2000	0-1	4-7	0-3	1	0-2	5-7	0	0
Cypress	1998-2000	6	5-7	7	1	6-7	5-7	0	0
Cocodrie	1998-2000	3-6	4-7	5-7	0	6-7	5-6	0	0-1
LaGrue	1998-2000	6	6	6-8	7-8	5-8	6-7	7	6-7
Wells	1998-2000	6-7	5-7	7-8	0	6-7	6-8	0	0
Jefferson	1998-2000	5	5-7	5-8	1	0-1	0-1	0-1	0-1

a

Pyricularia grisea races as defined using the international set of blast differentials. Composite leaf blast ratings on the 0 (none) -9 (maximum) disease scale in multiple comparative inoculated greenhouse tests conducted at the University of Arkansas Rice Research and Extension Center, Stuttgart, Arkansas and by Dr. M.A. Marchetti, USDA, Beaumont, Texas.

Ratings indicate relative susceptibility under conditions favorable for seedling blast.

[b] Disease ratings vary between tests. For conversion of the 0-9 disease scale to symbols R (resistant) = 0-3, MR (moderately resistant) = 3-4, MS (moderately susceptible) = 5-6, S (susceptible) = 7, and VS (very susceptible) = 8-9. Varieties rated MS may be damaged and those rated S or VS may be severely damaged under favorable blast conditions.

Table 1b. Summary leaf blast reactions in Ahrent and reference cultivars when inoculated with *Pyricularia grisea* races in Texas

Cultivar	1B-1	IB-45	IB-49	IB-54	IC-17	IE-1	IE-1k	IG-1	IH-1
Texas 1996									
Ahrent	0.0	1.0	1.0	1.0	1.0	0.5	3.5	1.0	0.0
Millie	2.5	3.3	5.5	5.0	6.0	4.0	3.5	5.0	5.0
LaGrue	5.0	3.0	5.5	4.0	6.5	5.5	4.4	8.0	4.0
Kaybonnet	0.0	1.0	1.0	0.5	1.0	0.5	4.0	1.0	1.0
Cypress	1.0	1.0	1.0	1.0	2.5	3.5	2.0	1.0	0.5
Drew	1.0	0.5	1.0	1.0	1.0	1.0	4.0	0.5	1.0
Texas 1995									
Ahrent	1.0	1.0	1.0	1.0	1.0	1.0	4.5	1.0	1.0
Millie	4.5	3.0	6.0	6.0	7.5	6.0	7.0	7.0	6.0
LaGrue	5.0	3.5	4.0	5.5	7.0	5.6	7.0	7.0	6.5
Kaybonnet	1.0	1.0	1.0	1.0	1.0	1.0	5.5	1.0	1.0
Cypress	3.0	1.0	1.0	1.0	6.5	4.0	5.0	1.0	1.0
Drew	1.0	1.0	1.0	1.0	1.0	1.0	6.5	1.0	1.0
Texas 1994									
Ahrent	0.0		1.0	0.0	0.0		4.5	0.3	0.5
Millie	5.6		7.5	7.0	6.5		5.5	6.3	5.5
LaGrue	5.5		6.5	5.0	5.5		4.5	6.0	6.0
Kaybonnet	0.0		1.0	0.0	0.5		4.5	1.0	0.5
Cypress	5.5		2.5	0.0	4.5		4.0	0.7	0.5
Drew	0.5		1.0	0.0	0.5		5.0	0.3	0.5

[a] Composite leaf blast ratings on the 0 (none) -9 (maximum) disease scale in multiple comparative inoculated greenhouse tests conducted by Dr. M.A. Marchetti, USDA, Beaumont, Texas. Ratings indicate relative susceptibility under conditions favorable for seedling blast.

[b] Disease ratings vary between tests. For conversion of the 0-9 disease scale to symbols R (resistant) = 0-3, MR (moderately resistant) = 3-4, MS (moderately susceptible) = 5-6, S (susceptible) = 7, and VS (very susceptible)-9. Varieties rated MS may be damaged and those rated S or VS may be severely damaged under favorable blast conditions.

EXHIBIT C

(RICE)

U.S. DEPARTMENT OF AGRICULTURE
PLANT VARIETY PROTECTION OFFICE, AMS, USDA
NATIONAL AGRICULTURAL LIBRARY Bldg., Rm. 500
10301 BALTIMORE Blvd.
BELTSVILLE, MD 20705

OBJECTIVE VARIETY DESCRIPTION
RICE (*Oryza sativa*)

Name of Applicant(s)	Temporary Designation	Variety Name
Karen A. K. Moldenhauer	RU9901030	'Ahrent'

Address (Street and No. or R.F.D. No., City, State, and Zip Code)
University of Arkansas
Rice Research and Extension Center
2900 Hwy 130 E.
Stuttgart, AR 72160

FOR OFFICIAL USE ONLY
PVPO Number
200200051

Place the appropriate number that describes the character of this variety in the spaces provided below. These numbers are also code numbers corresponding to descriptors developed by IBGR-IRRI Rice Advisory Committee and the US Rice Crop Advisory Committee. Breeders will demonstrate novelty more readily by describing as many characters as is possible.

1. MATURITY - Days to Heading (Seeding to 50% Heading):

A. South: (Location: Stuttgart) at _____ kg/ha (Nitrogen rate)

81 Number of days

3 Days earlier than Check variety: Wells

Days same as Check variety: Millie

3 Days later than Check variety: Jefferson

1 Maturity Class (50% heading) - South: 1 = Very early (less than 86 days) 2 = Early (86 - 100) 3 = Intermediate (101 - 115) 4 = Late (more than 115)

B. California: (Location: _____) at _____ kg/ha (Nitrogen rate)

____ Number of days

____ Days earlier than Check variety: _____

____ Days same as Check variety: _____

____ Days later than Check variety: _____

_____ Maturity Class (50% heading) - California: 1 = Very early (less than 91 days) 2 = Early (91 - 97) 3 = Intermediate (98 - 104) 4 = Late (more than 104 days)

2. CULM:

1 ANGLE (Degrees from Perpendicular after Flowering:

1 = Erect (less than 30°) 3 = Intermediate (about 45°) 5 = Open (about 60°)
7 = Spreading (more than 60° but the culms do not rest on the ground)
9 = Procumbent (the culm or its lower part rests on the ground surface)

2. CULM: (continued)

LENGTH

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__9__8_.__6__ cm (Soil level to top of extended panicle on main stem)

__1__0_.__2__ cm Shorter than Check variety: LaGrue

Length same as Check variety: Wells

__7_.__6__ cm Longer than Check variety: Cypress

__2__ HEIGHT CLASS: 1 = Semidwarf 2 = Short 3 = Medium 4 = Tall

__1__ INTERNODE COLOR (After flowering): 1 = Green 2 = Light Gold 3 = Purple lines 4 = Purple

__3__ STRENGTH (Lodging resistance): 1 = Strong (no lodging) 3 = Moderately strong (most plants leaning)
5 = Intermediate (most plants lodged) 7 = Weak (most plants flat)
9 = Very weak (all plants flat)

---

3. FLAG LEAF (After Heading):

__3__2_.__1__ cm LENGTH __1_.__9__ mm WIDTH

__1__ PUBESCENCE: 1 = Glabrous 2 = Intermediate 3 = Pubescent

__3__ LEAF ANGLE (after heading): 1 = Erect 3 = Intermediate 5 = Horizontal 7 = Descending

__3__ BLADE COLOR: 1 = Pale Green 2 = Green 3 = Dark Green 4 = Purple tips
5 = Purple margins 6 = Purple blotch 7 = Purple

__1__ BASAL LEAF SHEATH COLOR: 1 = Green 2 = Purple lines 3 = Light purple 4 = Purple

---

4. LIGULE:

__0_.__4__ mm LENGTH (from base of collar to the tip, at late vegetative stage)

__1__ COLOR (Late vegetative state): 1 = White 2 = Purple lines 3 = Purple

__2__ SHAPE: 1 = Acute to acuminate 2 = 2-Cleft 3 = Truncate

__1__ COLLAR COLOR (late vegetative stage): 1 = Pale green 2 = Green 3 = Purple

__1__ AURICLE COLOR (late vegetative stage): 1 = Pale green 2 = Purple

---

5. PANICLE:

__2__1_.__3__ cm LENGTH

__5__ TYPE: 1 = Compact 5 = Intermediate 9 = Open

__2__ SECONDARY BRANCHING: 1 = Absent 2 = Light 3 = Heavy 4 = Clustering

__2__ EXSERTION (near maturity): 1 = Less than 90% 2 = 90 - 99% 3 = 100% exserted

__2__ AXIS: 1 = Straight 2 = Droopy

__1__ SHATTERING: 1 = Very low (less than 1%) 3 = Low (1 - 5%) 5 = Moderate (6 - 25%)
7 = Moderately high (26 - 50%) 9 = High (more than 50%)

__2__ THRESHABILITY: 1 = Difficult 2 = Intermediate 3 = Easy

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6. GRAIN (Spikelet):

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__0__ AWNS (after full heading): 0 = Absent 1 = Short and partly awned 5 = Short and fully awned 7 = Long and partly awned 9 = Long and fully awned

__3__ APICULUS COLOR (at maturity): 1 = White 2 = Straw 3 = Brown (tawny) 4 = Red 5 = Red apex 6 = Purple 7 = Purple apex

__1__ STIGMA COLOR: 1 = White 2 = Light green 3 = Yellow 4 = Light purple 5 = Purple

__0__ LEMMA AND PALEA COLOR (at maturity):

0 = Straw
1 = Gold and/or gold furrows on straw background
2 = Brown spots on straw (piebald)
3 = Brown furrows on straw
4 = Brown (tawny)
5 = Reddish to light purple
6 = Purple spots on straw
7 = Purple furrows on straw
8 = Purple
9 = Black
10 = White

__1__ LEMMA AND PALEA PUBESCENCE: 1 = Glabrous 2 = Hairs on lemma keel 3 = Hairs on upper portion 4 = Short hairs 5 = Long hairs (velvety)

__1__ SPIKELET STERILITY (at maturity): 1 = Highly fertile (>90%) 3 = Fertile (75-90%) 5 = Partly sterile (50-74%) 7 = Highly sterile (<50% to trace) 9 = Completely sterile (0%)

7. GRAIN (Seed):

__4__ SEED COAT (bran) COLOR: 1 = White 2 = Light brown 3 = Speckled brown 4 = Brown 5 = Red 6 = Variable purple 7 = Purple

__1__ ENDOSPERM TYPE: 1 = Nonglutinous (nonwaxy) 2 = Glutinous (waxy) 3 = Indeterminate

__1__ ENDOSPERM TRANSLUCENCY: 1 = Clear 5 = Intermediate 9 = Opaque

__1__ ENDOSPERM CHALKINESS: 0 = None 1 = Small (less than 10% of sample) 5 = Medium (10-20% of sample) 9 = Large (more than 20% of sample)

__0__ SCENT (Aroma): 0 = Nonscented 1 = Lightly scented 2 = Scented

SHAPE CLASS (length/width ratio):

__3__ PADDY 1 = Short (2.2:1 and less) 2 = Medium (2.3:1 to 3.3:1) 3 = Long (3.4:1 and more)

__3__ BROWN 1 = Short (2.0:1 and less) 2 = Medium (2.1:1 to 3.0:1) 3 = Long (3.1:1 and more)

__3__ MILLED 1 = Short (1.9:1 and less) 2 = Medium (2.0:1 to 2.9:1) 3 = Long (3.0:1 and more)

MEASUREMENTS:

Grain Form	Length (mm)	Width (mm)	Thickness (mm)	L/W Ratio	1000 Grains (grams)
Paddy	8.7	2.4	1.9	3.6	20.37
Brown	6.4	2.0	1.7	3.2	16.87
Milled	6.3	2.0	1.6	3.2	16.08

__20__ Milling quality (% hulls) __61__ Milling yield (% whole kernel (head) rice to rough rice)

_____ % Protein __20.5__ % Amylose

Alkali Spreading value: _____ 1.5% KOH Solution __3-5__ 1.7% KOH Solution

7. GRAIN (Seed): (continued)

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5 GELATINIZATION TEMPERATURE TYPE: 1 = High 5 = Intermediate 7 = Low

Amylographic Paste Viscosity (Brabender Units)

Peak	Hot Paste	Cooled Paste	'Breakdown'	'Setback' (peak)	Setback trough
214.3	125.7	241.0	88.7	26. 7	115.3

8. RESISTANCE TO LOW TEMPERATURE:

2 GERMINATION AND SEEDLING VIGOR: 1 = Low 2 = Medium 3 = High

2 FLOWERING (Spikelet fertility): 1 = Low 2 = Medium 3 = High

9. SEEDLING VIGOR NOT RELATED TO LOW TEMPERATURE:

3 VIGOR: 1 = Low 2 = Medium 3 = High

10. BLAST RESISTANCE (*Pyricularia Oryzae*). (International races found under references)

0 = Immune 1 = Resistant 3 = Moderately resistant 5 = Intermediate 7 = Moderately susceptible 9 = Susceptible

Group		IB				IC		ID		IE	IG	IH
Number	1	33	45	49	54	1	17	1	13	1k	1	1
Resistance	1	7	1	1	1	___	1	___	___	7	1	1

11. RESISTANCE TO OTHER DISEASES:

0 = Immune 1 = Resistant 3 = Moderately resistant 5 = Intermediate 7 = Moderately susceptible 9 = Susceptible

5-7 Narrow Brown Leaf Spot *Cercospora oryzae*

3-5 Leaf Smut *Entyloma oryzae*

3-5 Brown Leaf Spot *Helminthosporium oryzae* (=*Bipolaris oryzae*) (=*Drechslera oryzae*)

N.D. Leaf Scald *Gerlachia oryzae*

N.D. Hoja Blanca Virus

N.D. Sheath Rot *Sarocladium oryzae*

N.D. Pythium Seedling Blight *Pythium* sp.

N.D. Sheath Spot *Rhizoctonia oryzae*

3 Other: Brown Spot *Cochliobolus myabeanus*_____

N.D. Aggregate Sheath Spot *Rhizoctonia oryzae-sativae*

7-8 Straight Head

4-5 Kernel Smut *Neovossia horrida* (=*Tilletia barclayana*)

6-7 False Smut *Ustilaginoidea virens*

N.D. White Tip Nematode *Aphelenchoides besseyi*

7 Stem Rot *Sclerotium oryzae*

N.D. Bacterial Blight *Xanthomonas campestris* pv. *oryzae*

6-7 Sheath Blight *Rhizoctonia solani*

12. INSECT RESISTANCE:

0 = Immune 1 = Resistant 3 = Moderately resistant 5 = Intermediate 7 = Moderately susceptible 9 = Susceptible

N.D. Grasshopper

N.D. Rice Leafhopper

N.D. Rice Hispa

N.D. Rice Midge

N.D. Least Skipper

9 Rice Stink Bug *Oebalus pugnax*

N.D. Swarm Caterpillar

N.D. Rice Water Weevil *Lissorhoptrus oryzophilus*

N.D. Rice Stalk Borer *Chilo plejadellus*

N.D. Sugarcane Borer *Diatraea saccharalis*

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. OTHER DESCRIPTORS: If there are other characters that describe this variety, please indicate below:

REFERENCES

. C. R. Adair *et al.* 1972. Rice in the United States: Varieties and Production. USDA Handbook No. 289 (Rev.), 124 pp.

. J. G. Atkins *et al.* 1967. An International Set of Rice Varieties for Differentiating Race of *Pyricularia Oryzae*. Phytopath. 57:297-301.

. IBPGR-IRRI Rice Advisory Committee. 1980. Descriptors for Rice *Oryza sativa* L.). International Rice Research Institute. 21 pp.

. K. C. Ling and S. H. Ou, 1969. Standardization of the International Race Numbers of *Pyricularia Oryzae*. Phytopath. 59:339-342.

. B. D. Webb *et al.* 1985. Utilization Characteristics and Qualities of United States Rice. In Proceedings on Rice Grain Quality and Marketing. International Rice Research Institute (IRRI), Los Banos, Philippines. p. 25-35.

TABLE 2. ARPT MEANS FOR AGRONOMIC CHARACTERISTICS.

1995 ARPT (Stuttgart, Pine Tree, Rohwer, Missouri and Keiser)

VARIETY	YIELD (BU/AC)	HEIGHT (IN.)	MATURITY (50% HD)	KERNEL WT (MG)	MILLING HR:TOT
Ahrent	176	40	78	15.8	58:67
LaGrue	165	42	82	17.7	50:69
Kaybonnet	147	41	85	15.4	58:70
Cypress	145	37	88	16.2	61:71
Drew	149	43	85	16.0	61:72
$C.V._{.05}$	8.7	4.6	1.4	2.2	2.1-.04

1998 ARPT (Stuttgart, Pine Tree, Rohwer and Keiser)

VARIETY	YIELD (BU/AC)	HEIGHT (IN.)	MATURITY (50% HD)	KERNEL WT (MG)	MILLING HR:TOT
Ahrent	165	41	80	16.6	64:68
Wells	151	42	84	18.3	61:70
LaGrue	158	45	84	18.2	61:69
Kaybonnet	138	44	82	15.4	63:69
Drew	157	46	85	15.3	64:69
Cocodrie	147	38	78	18.0	66:70
Cypress	147	38	83	16.7	66:70
Jefferson	137	36	76	20.0	60:70
$C.V._{.05}$	9.6	3.3	5.3	5.4	2.2-1.1

TABLE 2. ARPT MEANS BY YEAR (cont'd).

1999 ARPT (Stuttgart, Pine Tree, Rohwer and Keiser)

VARIETY	YIELD (BU/AC)	HEIGHT (IN.)	MATURITY (50% HD)	KERNEL WT (MG)	MILLING HR:TOT
Ahrent	172	40	81	16.1	61:70
Wells	169	39	83	17.9	55:74
LaGrue	180	43	83	17.4	60:73
Kaybonnet	157	42	82	14.3	58:72
Drew	160	44	86	15.7	57:71
Cocodrie	162	37	81	16.6	66:73
Cypress	144	37	84	16.7	67:73
Jefferson	146	35	78	18.2	53:69
C.V. $_{.05}$	17.7	4.8	6.6	8.3	15.6-2.8

2000 ARPT (Stuttgart, Pine Tree, Jackson Co., and Missouri)

VARIETY	YIELD (BU/AC)	HEIGHT (IN.)	MATURITY (50% HD)	KERNEL WT (MG)	MILLING HR:TOT
Ahrent	158	40	85	17.6	64:71
Wells	184	41	87	19.1	60:74
LaGrue	172	43	89	17.2	61:70
Kaybonnet	150	46	88	14.6	64:71
Drew	146	43	90	16.1	64:72
Cocodrie	159	38	86	17.1	65:72
Cypress	148	36	89	17.4	68:72
Jefferson	142	35	84	20.3	52:70
C.V. $_{.05}$	18.4	10.2	4.6	7.2	10.1-2.4

TABLE 3. 1998-2000 ARPT AVERAGES FOR AGRONOMIC CHARACTERISTICS.
(12 Tests: Stuttgart (3), Pine Tree (3), Jackson Co. (1), Rohwer (2), Keiser (2) and Missouri (1))

VARIETY	YIELD (BU/AC)	HEIGHT (IN.)	MATURITY (50% HD)	KERNEL WT (MG)	MILLING HR:TOT
Ahrent	164	40	82	16.8	63:70
Wells	169	41	85	18.4	59:73
LaGrue	170	44	85	17.6	61:71
Kaybonnet	148	44	84	14.8	62:71
Drew	154	44	87	15.7	62:71
Cocodrie	156	38	82	17.2	66:72
Cypress	146	37	85	16.9	67:72
Jefferson	142	35	79	19.5	55:70

TABLE 4. 1995 ARPT MEANS BY LOCATION

VARIETY	GRAIN YIELD (BU/AC)						HEAD RICE(%):TOTAL RICE(%)		
	RREC	PTES	SEBES	MO	NEREC	AVE	RREC	SEBES	AVE
Ahrent	210	171	177	171	153	176	55:66	60:67	58:67
LaGrue	178	156	179	164	150	165	50:69	50:69	50:69
Kaybonnet	159	157	161	119	133	146	58:70	58:70	58:70
Cypress	150	133	161	155	133	146	59:70	63:71	61:71
C.V. $_{.05}$	5.7	9.4	5.9	13.2	7.9	8.7	2.4-0.5	1.4-0.4	2.4-0.4

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TABLE 5. 1998 ARPT MEANS BY LOCATION

VARIETY	GRAIN YIELD (BU/AC)					HEAD RICE(%):TOTAL RICE(%)		
	RREC	PTES	SEBES	NEREC	AVE	RREC	SEBES	AVE
Ahrent	197	140	168	153	165	63:68	64:68	64:68
Wells	188	126	163	127	151	64:69	58:71	61:70
LaGrue	205	116	155	157	158	59:68	63:69	61:69
Kaybonnet	175	126	131	121	138	62:68	64:70	63:69
Drew	190	133	154	151	157	64:69	64:69	64:69
Cocodrie	199	125	134	129	147	63:68	68:72	66:70
Cypress	188	134	125	139	147	65:69	66:70	66:70
Jefferson	137	127	143	142	137	61:69	58:70	60:70
$C.V._{.05}$	8.7	13.3	9.7	11.0	9.6	2.3-0.8	2.2-0.9	2.2-1.1

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TABLE 6. 1999 ARPT MEANS BY LOCATION

VARIETY	GRAIN YIELD (BU/AC)					HEAD RICE(%):TOTAL RICE(%)		
	RREC	PTES	SEBES	NEREC	AVE	RREC	SEBES	AVE
Ahrent	175	173	162	177	172	65:71	56:69	61:70
Wells	173	191	182	130	169	68:75	41:73	55:74
LaGrue	178	176	218	146	180	66:73	53:72	60:73
Kaybonnet	157	174	187	109	157	68:73	47:71	58:72
Drew	157	163	190	130	160	67:69	46:72	57:71
Cocodrie	176	175	185	110	162	69:74	62:72	66:73
Cypress	156	148	157	113	144	71:74	62:72	67:73
Jefferson	150	120	162	150	146	63:71	43:67	53:69
C.V. $_{05}$	7.9	14.5	13.7	17.0	17.7	5.7-2.1	16.7-1.9	15.6-2.8

TABLE 7. 2000 ARPT MEANS BY LOCATION

VARIETY	GRAIN YIELD (BU/AC)					HEAD RICE(%):TOTAL RICE(%)			
	RREC	PTES	JC	MO	AVE	RREC	JC	PTES	AVE
Ahrent	154	145	174	160	158	66:71	63:71	63:70	64:71
Wells	187	164	218	169	184	47:73	68:75	66:75	60:74
LaGrue	176	164	188	161	172	52:69	66:72	64:70	61:70
Kaybonnet	156	141	166	137	150	56:70	69:72	67:72	64:71
Drew	167	131	196	91	146	61:72	65:72	65:73	64:72
Cocodrie	163	141	178	153	159	62:70	66:73	68:73	65:72
Cypress	154	139	188	109	148	63:70	71:74	70:73	68:72
Jefferson	158	118	149	143	142	53:70	59:71	44:69	52:70
C.V. $_{.05}$	10.0	10.4	14.8	18.4	18.4	7.8-2.1	7.9-2.0	4.3-1.7	10.1-2.4

Table 8. 1999-2000 ARKANSAS URN DATA, RREC, Stuttgart.

VARIETY	YIELD (BU/AC)	HEIGHT (IN.)	MATURITY (50% HD)	KERNEL WT (MG)	MILLING HR:TOT
1999					
Ahrent	165	41	88	16.3	62:71
Wells	182	44	88	18.7	60:72
LaGrue	180	50	88	18.2	61:71
Kaybonnet	181	41	85	14.8	58:70
Drew	182	44	88	16.3	60:70
Cocodrie	182	37	86	17.9	61:71
Cypress	173	37	88	17.4	64:71
Jefferson	153	37	85	19.2	51:71
2000					
Ahrent	185	39	84	16.5	51:71
Wells	212	41	86	19.5	54:73
LaGrue	221	44	86	18.1	57:70
Kaybonnet	186	43	86	16.3	58:72
Drew	177	44	87	16.3	53:73
Cocodrie	203	37	86	18.2	60:72
Cypress	168	37	87	18.4	58:73
Jefferson	166	38	78	20.3	45:71

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Table 9. 1999-2000 AVERAGES, ARKANSAS URN DATA

VARIETY	YIELD (BU/AC)	HEIGHT (IN.)	MATURITY (50% HD)	KERNEL WT (MG)	MILLING HR:TOT
Ahrent	175	40	86	16.4	57:71
Wells	197	43	87	19.1	57:73
LaGrue	201	47	87	18.2	59:71
Kaybonnet	184	42	86	15.6	58:71
Drew	180	44	88	16.3	57:72
Cocodrie	193	37	86	18.1	61:72
Cypress	171	37	88	17.9	61:72
Jefferson	160	38	82	19.8	48:71

TABLE 10. ARKANSAS URN DATA, GRAIN YIELD AND HEAD RICE, 1999.

VARIETY	GRAIN YIELD (BU/AC)					HEAD RICE(%):TOTAL RICE(%)				
	AR	LA	MS	TX	AVE	AR	LA	MS	TX	AVE
Ahrent	165	216	203	153	184	62:71	59:65	42:72	55:67	55:69
Wells	182	230	207	204	206	60:72	62:70	44:69	63:68	55:70
LaGrue	180	248	208	194	208	61:71	61:68	54:68	41:60	54:67
Kaybonnet	181	227	160	176	186	58:70	61:69	45:67	55:68	55:69
Drew	182	233	190	178	196	60:70	62:69	49:68	56:68	57:69
Cocodrie	182	240	174	177	193	61:71	60:67	68:73	57:68	62:70
Cypress	173	214	167	173	182	64:71	64:69	59:68	59:68	62:69
Jefferson	153	200	141	173	167	51:71	59:70	47:66	58:68	54:69

TABLE 11. ARKANSAS URN DATA, GRAIN YIELD AND HEAD RICE, 2000

VARIETY	GRAIN YIELD (BU/AC)					HEAD RICE(%):TOTAL RICE(%)				
	AR	LA	MS	TX	AVE	AR	LA	MS	TX	AVE
Ahrent	185	145	164	196	173	51:71	63:70	48:62	55:65	54:67
Wells	212	189	187	257	211	54:73	63:73	38:67	56:69	53:71
LaGrue	221	211	194	264	223	57:70	60:70	41:67	52:66	52:68
Kaybonnet	186	179	188	235	197	58:72	65:71	53:65	52:65	57:68
Drew	177	184	173	210	186	53:73	64:71	52:67	58:68	57:70
Cocodrie	203	181	195	227	202	60:72	64:70	51:65	59:68	59:69
Cypress	168	179	172	195	179	58:73	61:70	59:68	60:68	60:70
Jefferson	166	174	154	208	176	45:71	63:73	46:64	59:68	53:69

TABLE 12. 1999-2000 AVERAGES FOR ARKANSAS URN DATA.

VARIETY	GRAIN YIELD (BU/AC)					HEAD RICE(%):TOTAL RICE(%)				
	AR	LA	MS	TX	AVE	AR	LA	MS	TX	AVE
Ahrent	175	181	184	175	179	57:71	61:68	45:67	55:66	55:68
Wells	197	210	197	231	209	57:73	63:72	41:68	55:69	54:71
LaGrue	201	230	201	229	216	59:71	61:69	48:68	47:63	53:68
Kaybonnet	184	203	174	206	192	58:71	63:70	49:66	54:67	56:69
Drew	180	209	182	194	191	57:72	63:70	51:68	57:68	57:70
Cocodrie	193	211	185	202	198	61:72	62:69	60:69	58:68	61:70
Cypress	171	197	170	184	181	61:72	63:70	59:68	60:68	61:70
Jefferson	160	187	148	191	172	48:71	61:72	47:65	59:68	54:69

TABLE 13. KERNEL MEASUREMENTS

VARIETY	CLASS	LENGTH	WIDTH	THICKNESS	L/W RATIO
Ahrent	ROUGH	8.72	2.40	1.91	3.63
Millie*	ROUGH	9.88	2.56	1.97	3.86
Wells	ROUGH	9.46	2.31	1.80	4.10
LaGrue	ROUGH	9.36	2.58	1.96	3.63
Cocodrie	ROUGH	9.29	2.54	1.98	3.66
Cypress	ROUGH	9.03	2.31	1.80	3.91
Jefferson	ROUGH	9.61	2.68	2.05	3.59
Ahrent	BROWN	6.35	2.01	1.73	3.16
Millie*	BROWN	7.50	2.23	1.73	3.36
Wells	BROWN	7.34	2.05	1.63	3.58
LaGrue	BROWN	7.43	2.21	1.77	3.36
Cocodrie	BROWN	6.76	2.12	1.72	3.19
Cypress	BROWN	6.79	1.97	1.60	3.45
Jefferson	BROWN	7.29	2.29	1.85	3.18
Ahrent	MILLED	6.33	1.96	1.64	3.23
Millie*	MILLED	7.16	2.17	1.70	3.30
Wells	MILLED	7.00	1.94	1.51	3.61
LaGrue	MILLED	7.07	2.13	1.70	3.32
Cocodrie	MILLED	6.46	2.06	1.68	3.14
Cypress	MILLED	6.98	2.17	1.71	3.22
Jefferson	MILLED	7.05	2.25	1.76	3.13

* Data from Registration of 'Millie' rice. Crop Science 31:229-230.

DISEASE EVALUATIONS OF AHRENT

Dr. F.L. Lee, University of Arkansas Rice Research and Extension Center, Stuttgart
Dr M.A. Marchetti, USDA, Beaumont, Texas
Dr D.E. Groth, Louisiana State University, Rice Research Station, Crowley, Louisiana.

Funding to improve and utilize varietal resistance for the control of rice diseases in Arkansas comes almost entirely from grower check-off monies administered by the Rice Research and Promotion Board. These funds are used to monitor and identify diseases in order to establish resource allocation priorities, conduct preliminary research needed to identify and improve genetic resistance sources, support the greenhouse and field diseases on experiment stations and in grower fields, and maintain qualified support staff necessary to incorporate quality disease resistance in new cultivars released for use by Arkansas rice producers.

Varietal resistance is the most efficient and reliable means of controlling rice diseases. Conservation and improvement of disease resistance is a continuous endeavor basic to varietal development. Incorporation of existing and new resistance sources is a complex process limited by several variables. The rice disease research program routinely evaluates breeding program entries to provide disease data required for superior variety development. Our objectives are to increase varietal disease resistance and to define disease liabilities of new varieties released for rice production in Arkansas.

Rice diseases are usually rated visually on a 0-9 scale to estimate degree of severity. Numerical data is often converted to this scale. A rating of zero indicates complete disease immunity. A rating of one to three indicates resistance where little loss occurs and in the case of rice blast pathogen growth is restricted considerably. Conversely, a nine rating indicates maximum disease susceptibility, which typically results in complete plant death and/or yield loss. Depending upon the disease in question, a disease rating of four to six is usually indicative of acceptable disease resistance under conditions slightly favoring the pathogen. Numerical ratings are sometimes converted to letter symbols where 0-3 = R (resistant), 3-4 = MR (moderately resistant), 5-6 = MS (moderately susceptible) 7 = S (susceptible) and 8-9 VS (very susceptible). Exceptions to established ratings do occur unexpectedly as disease situations change.

These data come from several sources. Advanced and promising breeding lines are normally evaluated by researchers in other states. It is not unusual for ratings to vary with location and year due to environmental differences and research procedures. Ratings within a source traditionally have been consistent.

Greenhouse blast tests are the primary means of screening large number of entries for varietal reaction to the many blast races occurring in the production areas. Although results are quite variable and testing conditions tends to overwhelm any field resistance present in the entry, this test provides an accurate definition of the fungus-variety genetics. Blast field nurseries, utilizing both natural and lab produced inoculum, are established in an effort to better define blast susceptibility under field conditions. Since field nursery is also quite variable, new techniques are currently being developed and evaluated to better estimate cultivar field resistance to blast.

Field nurseries are established and artificially inoculated to provide a uniform disease pressure for evaluations under field conditions. Grower nurseries are established operate in an effort to evaluate disease reactions in grower fields under current production practices. Over time these nurseries document variety performance under adverse disease conditions in Arkansas production fields.

Table 1. Summary leaf blast reactions in Ahrent and reference cultivars inoculated with races of *Pyricularia grisea* in greenhouse tests .

Cultivar	Test period	International Blast Race[a]							
		IB-1	IB-33	IB-49	IB-54	IC-17	IE-1K	IG-1	IH-1
Ahrent	1994-1996	1	6-7	1	1	1	6-7	1-2	1-2
Kaybonnet	1994-1996	5-7	1	1	1	7-8	1	1	
Cypress	1994-1996	4-5	6	5-7	1	5-7	6-7	1	1
LaGrue	1994-1996	5-6	7-8	5-8	4-5	5-8	7-8	6-8	7
Ahrent	1998-2000	1-3	5-7	0-2	0	1-3	4-7	0	0
Drew	1998-2000	0-1	4-7	0-3	1	0-2	5-7	0	0
Cypress	1998-2000	6	5-7	7	1	6-7	5-7	0	0
Cocodrie	1998-2000	3-6	4-7	5-7	0	6-7	5-6	0	0-1
LaGrue	1998-2000	6	6	6-8	7-8	5-8	6-7	7	6-7
Wells	1998-2000	6-7	5-7	7-8	0	6-7	6-8	0	0
Jefferson	1998-2000	5	5-7	5-8	1	0-1	0-1	0-1	0-1

[a] *Pyricularia grisea* races as defined using the international set of blast differentials. Composite leaf blast ratings on the 0 (none) -9 (maximum) disease scale in multiple comparative inoculated greenhouse tests conducted at the University of Arkansas Rice Research and Extension Center, Stuttgart, Arkansas and by Dr. M.A. Marchetti, USDA, Beaumont, Texas.
Ratings indicate relative susceptibility under conditions favorable for seedling blast.
[b] Disease ratings vary between tests. For conversion of the 0-9 disease scale to symbols R (resistant) = 0-3, MR (moderately resistant) = 3-4, MS (moderately susceptible) = 5-6, S (susceptible) = 7, and VS (very susceptible) = 8-9. Varieties rated MS may be damaged and those rated S or VS may be severely damaged under favorable blast conditions.

Table 2. Summary composite leaf and panicle blast ratings for Ahrent and reference cultivars in inoculated field nurseries and non-inoculated grower plots.

		Blast field data source[a]						
		Arkansas			Texas[b]		Louisiana[c]	
Variety	Year	Leaf	Panicle	Grower	Leaf	Panicle	Leaf	Panicle
Ahrent	1994-1996	5	2-4	2	1-3	-	1	-
Kaybonnet	1994-1996	1-3	1-2	3	1	-	1	2
Cypress	1994-1996	5	5-6	6	3-5	-	1	4
LaGrue	1994-1996	7	6-7	8	5-8	-	3	2
Ahrent	1998-2000	1-3	3-5	-	-	-	3-4	1-3
Drew	1998-2000	1	1-3	-	-	-	2-3	1
Cypress	1998-2000	3-5	5-6	-	-	-	3-5	3
LaGrue	1998-2000	6-7	6-8	-	-	-	5	2
Cocodrie	1998-2000	2-4	5-7	-	-	-	2-4	2-5

[a] Composite leaf and panicle blast ratings, using the 0-9 disease rating scale, from inoculated and non-inoculated field tests at the indicated locations. Subjective blast ratings indicate range of relative susceptibility under very favorable environmental conditions. Conversion of the 0-9 disease scale to symbols. R (resistant) = 0-3, MR (moderately resistant) = 3-4, MS (moderately susceptible) = 5-6, S (susceptible) = 7, and VS (very susceptible) = 8-9. Varieties labeled MS may be damaged and those labeled S or VS likely will be severely damaged under favorable environmental conditions.

[b] Disease nursery data supplied by Dr M.A. Marchetti, USDA, Beaumont, Texas

[c] Disease nursery data supplied by Dr D.E. Groth, Louisiana State University Agricultural Experiment Station, Rice Research Station, Crowley, Louisiana.

Table 3. Summary sheath blight ratings for Ahrent and reference cultivars in inoculated field nurseries and non-inoculated grower plots.

		Sheath Blight Data Source [a]			
		Arkansas		Texas[b]	Louisiana[c]
Variety	Test Period	Inoculated Nursery	Grower Field	Inoculated Nursery	Inoculated Nursery
Ahrent	1994-1996	5-6	-	6	7
Kaybonnet	1994-1996	5-6	-	6	6
Cypress	1994-1996	6-7	-	6	7
LaGrue	1994-1996	5-7	-	4	5-6
Ahrent	1998-2000	7	0-4	-	6-7
Drew	1998-2000	6-7	0-3	-	5-7
Cypress	1998-2000	7-8	4-8	-	7-8
LaGrue	1998-2000	6-7	0-5	-	5-7
Cocodrie	1998-2000	7-8	3-5	-	6-8

[a] Composite sheath blight evaluations on the 0-9 disease rating scale from the indicated source. Nursery ratings indicate relative susceptibility under favorable sheath blight conditions. Conversion of the 0-9 disease scale to symbols: R (resistant - lesions on or below lower 20 % of total plant height) = 0-3, MR (moderately resistant - lesions below 40 % of height) = 3-4, MS (moderately susceptible - lesions covering 50-60 % of plant height) = 5-6, S (susceptible - many infected flag leaf sheaths) = 7, and VS (very susceptible - lesions covering flag leaf sheath and above with significant panicle death) 8-9.

[b] Disease nursery data supplied by Dr M.A. Marchetti, USDA, Beaumont, Texas

[c] Disease nursery data supplied by Dr D.E. Groth, Louisiana State University Agricultural Experiment Station, Rice Research Station, Crowley, Louisiana.

Table 4. Relative disease reaction observed with Ahrent and reference varieties for selected diseases.

	Disease[a]						
	Stem[b] Rot	Sheath[c] Rot	Leaf[d] Smut	Brown[d] Spot	Narrow Brown[d] Leaf spot	False[e] Smut	Panicle[d] Blight
Ahrent	2	22.5	3-5	0-4	5-7	7	1-2
LaGrue	2.3	21.3	1-3	1-3	1-3	10.3	3
Kaybonnet	--	--	1-5	2-4	1-3	1.3	--
Cypress	3.3	28.8	3-5	1-2	2-4	10.7	4
Drew	2	21.3	3-5	--	3-4	26.7	2
Cocodrie	4	2.7	27.5	2	--	3	7.3

[a] Ratings indicate estimated relative susceptibility under various field conditions. Available data were limited for these diseases and must be confirmed in future tests. Conversion of the 0-9 disease scale to symbols: R (resistant) = 0-3, MR (moderately resistant) = 3-4, MS (moderately susceptible) = 5-6, S (susceptible) = 7, and VS (very susceptible) = 8-9.

[b] Disease index (1-5). Disease rating obtained from the 1999 inoculated stem stem rot nursery plots conducted at Pine Tree, Arkansas.

[c] Disease progress up the stem relative to total height. Disease rating obtained from the 1999 inoculated stem stem rot nursery plots conducted at Pine Tree, Arkansas.

[d] Disease rating obtained from 1999-00 disease evaluation data provided by Dr. D.E. Groth, LSU Rice Experiment Station, Crowley, Louisiana with confirmation in the 2000 Arkansas grower disease monitoring plots.

[e] Number smut balls per pound harvested seed. Data obtained from the 2000 Arkansas grower disease monitoring plots conducted in Jackson county, Arkansas.

Discolored Kernels

Dr. J. Bernhardt, University of Arkansas Rice Research and Extension Center, Stuttgart

An increasingly important aspect of rice quality is the level of discolored kernels. In the field, kernel discolorations are caused by (1) fungi alone, (2) fungi introduced through feeding probes of insects, and (3) physiological responses to adverse environmental conditions during grain fill see following photograph. Infection by kernel smut, brown spot, or other fungi alone often cause black, brown, red, or pink discolored kernels. Rice stink bug adults and nymphs commonly are found in all Arkansas rice fields and feed on rice kernels at all stages of development except at hard dough and maturity. Very often because the hull is pierced by rice stink bugs fungi gain entry and the infection results in discolored and chalky kernels. Another cause of discolored kernels is apparently physiological and has been called linear discolored kernels. Linear discolored kernels have a straight (linear) 'cut' in the kernel that is surrounded by a dark brown to black area. All agents that discolor rice kernels are commonly found in all Arkansas rice fields. However, local environmental conditions control the level to which any one of the agents infest rice and rice varieties have different levels of susceptibility. Regardless of the cause, discolored kernels are costly to growers and millers.

Table 1. Average percentage discolored kernels, by weight in brown rice, in selected entries of the early season of the ARPT, 2000 (RB, PT, J.CO).

Line	Grain	% Rice Stink	% Smut	% Other	% Linear
Jefferson	L	0.52	0.103	0.454	0.021
Cocodrie	L	1.07	0.102	0.756	0.051
Maybelle	L	0.65	0.169	0.317	0.025
Ahrent	L	1.47	0.079	1.664	0.005

Table 2. Average percentage discolored kernels, by weight in brown rice, in selected entries of the very short season of the ARPT, 1999 (RB, SEB, PT, J.CO).

Line	Grain	% Rice Stink	% Smut	% Other	% Linear
Bengal	M	2.30	0.030	0.408	0.112
Millie	L	1.64	0.024	0.488	0.046
Jackson	L	1.39	0.037	0.543	0.041
Cocodrie	L	1.90	0.067	0.889	0.119
RU9901030	L	2.32	0.017	0.680	0.065

Table 3. Average percentage discolored kernels, by weight in brown rice, in selected entries of the short season of the ARPT, 1998 (RB, SEB, NEB, PT).

Line	Grain	% Rice Stink	% Smut	% Other	% Linear
Bengal	M	2.80	0.093	0.679	0.097
Lafitte	M	2.22	0.215	0.896	0.239
Kaybonnet	L	0.89	0.054	0.238	0.023
LaGrue	L	0.94	0.321	0.295	0.014
Cocodrie	L	1.99	0.165	0.791	0.036
Priscilla	L	1.41	0.341	0.442	0.012
RU9401188	L	1.67	0.046	0.664	0.004

Table 4. Average percentage discolored kernels, by weight in brown rice, in entries of Group 2 in the URRN that was grown in Arkansas, 2000 (20 entries - 8 medium grain and 12 long grain).

Line	Grain Type	% Rice Stink	% Smut	% Other	% Linear
Bengal	M	0.42	0.003	0.331	0.051
Earl	M	0.69	0	0.249	0
Wells	L	0.43	0.007	0.207	0
LaGrue	L	0.37	0.006	0.432	0.011
RU9901030	L	0.32	0	0.535	0

Table 5. Average percentage discolored kernels, by weight in brown rice, in entries of Group 2 in the URRN that was grown in Arkansas, 1999 (20 entries - 6 medium grain and 14 long grain).

Line	Grain Type	% Rice Stink	% Smut	% Other	% Linear
Bengal	M	2.93	0.104	0.652	0.066
Lafitte	M	2.27	0.126	1.200	0.162
Wells	L	1.48	0.043	0.243	0.009
LaGrue	L	1.41	0.109	0.172	0.010
Ahrent	L	2.37	0.024	0.803	0

Table 6. Average percentage discolored kernels, by weight in brown rice, in entries of Group 2 in the URRN that was grown in Mississippi, 1999 (20 entries - 6 medium grain and 14 long grain)

Line	Grain Type	% Rice Stink	% Smut	% Other	% Linear
Bengal	M	3.57	0.028	1.129	0.120
Lafitte	M	1.80	0.068	0.868	0.099
Wells	L	1.73	0.005	0.158	0.003
LaGrue	L	0.82	0.011	0.218	0
Ahrent	L	1.41	0.018	0.647	0.001

Table 7. Average percentage discolored kernels, by weight in brown rice, in entries of Group 2 in the URRN that was grown in Texas, 1999 (20 entries - 6 medium grain and 14 long grain)

Line	Grain Type	% Rice Stink	% Smut	% Other	% Linear
Bengal	M	2.28	0	2.330	0.028
Lafitte	M	2.72	0	1.283	0.124
Wells	L	1.60	0	0.386	0
LaGrue	L	0.85	0	0.594	0.011
RU9901030	L	2.50	0	1.940	0

Susceptibility of Ahrent to Discolored Kernels: (1) more susceptible to rice stink bug than Wells and LaGrue; (2) less susceptible to kernel smut than LaGrue; (3) not susceptible to linear discoloration; and (4) about the same susceptibility to all other discolorations as Bengal.

Straighthead Evaluation

Dr. R. Dilday, USDA-ARS Dale Bumpers National Rice Research Center, Stuttgart

Straighthead is a physiological disorder which appears to be effected by the oxygen potential of the soil. Under certain conditions, arsenic levels can increase in these soils or on soils where cotton has been grown and MSMA or other arsenical pesticides have been applied. Straighthead may also occur in soils high in organic matter. Symptoms can only be detected after panicle emerge and fail to produce grain. Foliage tends to remain dark green. Rice grains may be distorted especially on long-grain varieties forming a parrot-beak on the end of the hull. Floral parts may also be missing and under sever conditions panicle fail to emerge from the boot.

Uniform Regional Rice Nursery Straighthead Rating[a]- Stuttgart.

Cultivar	URRN 1999	URRN 2000	ARPT 1999	ARPT 2000
Ahrent	7.0	8.3	7.0	7.3
LaGrue	7.0	5.7	7.0	7.6
Kaybonnet	7.7	8.0	7.0	8.3
Drew	6.8	6.8	7.0	7.0
Katy			8.5	8.5
Cocodrie	8.3	8.7	9.0	8.5
Jefferson	5.8	6.3	4.5	6.3

[a] Rating Scale:

0 = no damage
1 = 81-90% grain develop
2 = 71-80% grain develop & 96-100% panicles broken from vertical
3 = 61-80% grain develop & 91-95% panicles broken from vertical
4 = 41-60% grain develop & 61-90% panicles broken from vertical
5 = 21-40% grain develop & 31-60% panicles broken from vertical - initial appearance of parrot-beak distortion
6 = 11-20% grain develop & 10-30% panicles broken from vertical
7 = panicles emerged but totally up right; only 0-10% grain develop
8 = 0-10% panicle emergence, no seed produced
9 = no panicles

20020051

Response to Nitrogen and DD50 Threshold

Dr. R.N. Norman, University of Arkansas, Fayetteville
Dr. C.Wilson, Jr., U. of Ar. Cooperative Extension Service, Stuttgart
Dr. N. Slaton, University of Arkansas, Fayetteville

DD 50 Accumulations for 1999 and 2000 for Ahrent.

Year	Emergence Date	1/2 inch Internode Elongation		50% Heading	
		DD50 Units	days	DD50 units	days
1999	April 13	1320	56	2073	82
1999	May 27	1163	40	2020	68
1999	June 10	1345	44	2216	74

Comparison of Ahrent DD50 threshold established in DD50 tests to other cultivars. Based on this data to 50% heading the maturity of Ahrent based on May 27th, 1999 planting.

Cultivar	DD50 Accumulations	
	½ inch Internode Elongation	50% Heading
Ahrent	1163	2020
Wells	1234	2209
Cocodrie	992	2116
Drew	1206	2105
Jefferson	1160	1924

Based on 2000 data in the Variety X Nitrogen trials, the recommendation for N fertilizer for Ahrent is 135 units.

20020051

EXHIBIT D

U.S.DEPARTMENT OF AGRICULTURE
PLANT VARIETY PROTECTION OFFICE, AMS, USDA
NATIONAL AGRICULTURE LIBRARY Bldg., Rm. 500
10301 BALTIMORE Blvd.
BELTSVILLE, MD 20705

ADDITIONAL DESCRIPTION OF THE VARIETY

- Approval for Release of Plant Materials
- Data on New Variety for Certification
- Registration of Crop Cultivars for parent varieties

20020005 1

ATTACHMENT 1

Arkansas Agricultural Experiment Station

APPROVAL FORM FOR RELEASE OF PLANT MATERIALS

Distribution Following Final Action:
White - Assoc. V.P.-Res. Office
Canary - Unit Head
Goldenrod - PMRC Chairman

INSTRUCTIONS: Submit typed approval form, along with plant materials proposal, to Unit Head (UH); UH will forward approved proposals to the Plant Materials Release Committee (PMRC) who will recommend approval or disapproval to AAES Assoc. V.P.-Research. Upon decision the packet is returned to PMRC, who will distribute documents to appropriate agencies, UH and PMRC secretary. An approved packet will be retained in AAES as a file; the disapproved packet will be returned to UH who will deliver it to the scientist.

Department Rice Res. & Ext. Ctr. AAES (Scientist(s): K.A.K. Moldenhauer, J.W. Gibbons, F.N. Lee, J.L. Bernhardt, R.J. Norman, N.A. Slaton, M.M. Anders, C. Wilson

Common and Scientific Name: Rice (Oryza sativa L.)

Experimental Designation: RU9901030

Suggested Name(s): Ahrent

Type of Release Proposed (Check all applicable categories:) Germplasm ____ Parental Line ____

Commercial Cultivar X Unrestricted Public ____ Restricted ____ PVPA or Patent Protection X

Cooperating Agency(ies) & Scientist(s): ____

Departmental Approval: Ken Moldenhauer — Lead Scientist — 2/26/2001 Date

John F. Robinson — Unit Head — 2/27/2001 Date

Plant Materials Release Committee Recommendations: Approve ____ Disapprove ____ Conditional ____

Recommended Name: ____

Comments: ____

PMRC Chairman ____ Date ____

Comments ____

Permission to release information to public: Yes ____ No ____ Exception ____

Date on or after which information may be publically released: ____

If exception, please explain: ____

Associate Vice President-Research of AAES ____ Date ____

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DATA ON NEW VARIETY FOR CERTIFICATION

2002 00051

1. Variety name or temporary designation: 'AHRENT' (RU9901030) - Rice long-grain (Variety - Kind)

Poaceae Oryzea Oryza sativa L. (Family - Genus - Species)

2. By whom selection was made K.A. K. Moldenhauer, University of Arkansas Rice (Breeder) (applicant or sponsor's name & address)

Research and Extension Center, P.O. Box 351, Stuttgart

3. Cross form which first selected Line from recurrent selection (selecting F_2 and crossing many parents) {[{(VSTA/NTAI)F_1//LMNT}F_2-1/4/{L201/3/(9628//NROS/ZNTH)}F_2-2]F_2-2/5/KATY)F_2-3)/6/ {[{(VSTA/NTAI)F_1//LMNT}F_2-1/4/{L201/3/(9628//NROS/ZNTH)}F_2-2]F_2-1/5]/(TBNT/LBLE)F_2-1 /4/{L201/3/(9628//NROS/ZNTH)}F_2-1]F_2-1)F_2-4.

4. Location and year of selection Rice Res. & Ext. Ctr., Stuttgart, AR - 1993

5. Number of years tested and location of test 1995-1996, and 1998-2000 at Stuttgart, AR; Crowley, LA; Beaumont, TX; and Stoneville MS

6. Breeding procedure use in its development Hybridization, combination of modified using recurrent selection, and a combination of pedigree and bulk breeding methods.

7. Area (s) of adaptation Southern U.S. rice growing region

8. Procedure for maintaining stock seed classes and number of generations variety may be multiplied Headrow, Breeder and foundation seed will be maintained at the University of Arkansas Rice research & Extension Center, P.O. Box 351, Stuttagrt, AR 72160

9. Description of the manner in which the variety is constituted when a particular cycle of reproduction or multiplication is specified Not Applicable.

10. Additional restrictions on the variety, specified by the breeder, with respect to geographic area of seed production, age of stand, or other factor affecting genetic purity.
Not Applicable

11. Submit a sample of seed representative of the variety as marked.

12. Will application be made to plant variety protection office? Yes____, No____, Undecided X

13. Will application specify the variety to be sold only as a class of certified seed? No

Variety & Kind: Ahrent - rice

200200051

14. Distinguishing Characteristics of Morphology and Physiology:

A. Soybeans

1. Hilum Color_____
2. Plant height_approximately____103 cm (range 80 - 130cm)
3. Hypocotyl Color_____
4. Plant puebescence color_____
5. Seed shape_____
6. Seed coat color_____
7. Seed coat luster_____
8. Leaflet shape_____
9. Leaf color_____
10. Pod color_____
11. Plant habit_____
12. Plant type_____
13. Maturity group_____
14. Peroxidase reaction_____
15. Seed Size_____

B. Wheat, Oats & Rice

1. Grain type long-grain
2. Plant height approximately 103 cm (range 80 - 130cm)
3. Plant color at booting green to dark green
4. HEAD: Moderately exserted intermediate.
5. Type panicle light shattering
   a. Density Intermediate
   b. Awnedness awnless, maybe tip awns under high fertility
   c. Color_____
   d. Length panicle approx. 21.3cm range 16 -26.5cm
5. Apiculus color mainly purple fade to brown at maturity
6. Maturity approx. 112 - 118 days
7. Leaves Erect plant type, green flags erect to intermediate (effected by high N fertility) leaf margin may be pubescent
8. Seed Shape
9. Seed Color Lemma & palea are mainly straw colored at maturity, red to purple may be present due to the environment, seed coat is light brown to brown
10. Phenol reaction nonaromatic, nonglutinous endosperm
11. Florescence reaction_____
12. Seed Size approximately 20.4 mg rough rice (Grams/100 seeed)

15. Disease reactions-include all disease tested for (Susceptible or Resistant)

On a scale of 0 = immune, 9 = maximum disease, Preliminary ratings for Ahrent indicate a 6-7 for sheath blight (Rhizoctonia solani Kuhn) and the following ratings for rice blast (Pyricularia grisea) races IG-1 = 3, IH = 1, IC-17 = 3, IB-49 = 2, IB-45 = 1, IB-1 = 3, IB1J=4, IB-54 =0, IB-17=1, IE-1 = 1, I E-1k = 5-7,

16. Describe the number per pound or percent and kinds of variants. eg. hilum color, hypocotyl color, peroxidase reaction, phenol reaction, etc. The original release of foundation may contain the following in any combination: taller, shorter, earlier, later, glaborous or pubescent plants, as well as intermediate or long-grains and grains with long awns. Other atypical plants may still be encountered in the variety. The total variants and/or off-types numbered less than 1 per 5000 plants.

Signed _____ Date

Application is not being made for protection of Bonnet 73 under the Plant Variety Protection Act. The University of Arkansas Rice Branch Experiment Station, P. O. Box 351, Stuttgart, AR 72160, will maintain breeder and foundation seed.

REGISTRATION OF DELLA RICE[1]

(Reg. No. 37)

Nelson E. Jodon[2] and Earl A. Sonnier[3]

'DELLA' rice (*Oryza sativa* L.), C.I. 9483, was developed cooperatively at the Rice Experiment Station, Crowley, Louisiana by the Agricultural Research Service, USDA, and the Louisiana Agricultural Experiment Station.

It was a selection from the cross 'R-D' × ('Century' × 'Rexoro'-'Zenith') and was released to growers in March 1971 as a specialty cultivar having a characteristic flavor (Jodon, Sonnier, and McIlrath, 1971).

The ancestral varieties except R-D have been registered (Johnston, 1958). R-D is a relatively late maturing selection from a Rexoro × 'Delitus' cross, made at Beaumont, Texas in 1932 (Jones et al. 1953). R-D and 'Delrex' (selected from the same cross at Crowley), received a distinctive flavor and aroma from Delitus, an early midseason variety released from Crowley in 1918 (Chambliss and Jenkins, 1923). Aromatic or scented varieties have not had an established U.S. market and have been grown on a limited scale, mainly for local consumption. However, scented or aromatic rice is highly prized in parts of southern Asia. The Basmati rices of India and Pakistan are examples. Della is suitable for a specialty trade to supply consumers who appreciate the distinctive flavor. The novelty of a rice with a nutty or popcorn-like flavor could be used to advantage in the promotion of domestic rice consumption and as an export item.

Della is a short-season, long-grain variety with smooth, straw colored hulls. It is similar to 'Dawn' in maturity, plant height, and grain size. Data on disease reactions are given in Tables 1 and 2. Compared with Dawn, Della does not stand or yield as well but does mill as well or better. Della cooks dry and flaky, as is typical of U.S. long-grain varieties (Webb et al. 1972). It was entered in the Regional Uniform Rice Performance Nursery in 1962; the 10-year average grain yield at Crowley was 5,076 kg/ha vs. 5,528 kg/ha from Dawn.

The average length and width of Della rough rice grains are 10.10 and 2.71 mm, compared with those of 'Starbonnet,' which are 8.75 and 2.55 mm. The average length and width of Della milled whole kernels are 7.60 and 2.22 mm vs. 6.84 and 2.14 for those of Starbonnet. The comparative average weights of Della and Starbonnet grains are 28.9 and 21.6 g/1,000 grains, respectively. The comparative average weights of Della and Starbonnet milled whole kernels are 18.1 and 15.6 g/1,000 kernels, respectively.

Application is not being made for protection under the Plant Variety Protection Act. The Louisiana State University Rice Experiment Station, Crowley, LA 70526, will maintain breeder and foundation seed.

[1] Registered by the Crop Science Society of America. Cooperative investigations, Agricultural Research Service, USDA, and Louisiana Agricultural Experiment Station. Received September 7, 1973.

[2] Formerly Research Agronomist, Southern Region, ARS, USDA, LSU Rice Experiment Station, Crowley, LA 70526.

[3] Assistant Professor, Louisiana State University Rice Experiment Station, Crowley, LA 70526.

REGISTRATION OF LABELLE RICE[1]

(Reg. No. 38)

C. N. Bollich, J. G. Atkins, J. E. Scott, and B. D. Webb[2]

'LABELLE' rice (*Oryza sativa* L.), C.I. 9708, was developed cooperatively by the Agricultural Research Service, USDA, the Texas Agricultural Experiment Station, and the Texas Rice Improvement Association. It was developed from the cross 'Belle Patna' × 'Dawn,' Beaumont Cross B6311A, made in 1963. Labelle was entered in the Regional Uniform Rice Performance Nursery in 1969 as selection B6311A-5584-5-8. Seed from a head

[1] Registered by the Crop Science Society of America. Cooperative investigations, Agricultural Research Service, USDA; Texas A&M University Agricultural Research and Extension Center of the Texas Agricultural Experiment Station; and the Texas Rice Improvement Association. Received September 7, 1973.

[2] Research Agronomist and Research Pathologist (deceased), Southern Region, ARS, USDA; Research Associate, Texas Agricultural Experiment Station; and Research Chemist, Southern Region, ARS, USDA; respectively. Texas A&M Univ. Agricultural Research and Extension Center, Beaumont, TX 77706.

Table 1. Reaction of indicated rice cultivars to the International Races of *Pyricularia oryzae* Cav., the organism causing rice blast disease.*

Cultivar	Reg. No.	C. I. No.	International race designation: IB-54	IH-1	IG-1	ID-13	IB-1	IC-17	IB-49	IB-5
Bonnet 73	36	9654	S	M	M	S	S	S	S	S
Della	37	9483	S	R	S	S	S	S	S	S
Labelle	38	9708	R	R	R	R	R	S	M	R
Nortai	39	9836	S	R	S	S	S	R	R	S
Vista	40	9628-2	R	R	R	S	S	S	S	S
Starbonnet (check)	31	9584	M	R	S	S	S	S	S	S
Dawn (check)	33	9534	R	R	R	R	R	M	M	R

* Unpublished data supplied by John G. Atkins and C. N. Bollich, USDA-ARS-SR, Beaumont, Texas.

Table 2. Reaction of indicated rice cultivars to common diseases of rice in the United States.*

Disease and causal organism	Cultivar and Registration Number: Bonnet 73 (36)	Della (37)	Labelle (38)	Nortai (39)	Vista (40)	Starbonnet ck (31)	Dawn ck (33)
Straighthead (physiological)	MR	S	R	R	S	MR	VS
Brown-bordered leaf and sheath spot *Rhizoctonia solani* Kuhn.	S	S	S	MS	S	S	VS
Brown leaf spot *Helminthosporium oryzae* Van Breda de Haan	MR	MS	MS	MS	MS	S	MR
Kernel smut *Tilletia barclayana* (Bref) Sacc. and Syd.	S	S	S	MR	S	S	S
Stem rot *Sclerotium oryzae* Catt.	S	S	S	--	S	S	S
White tip *Aphelenchoides besseyi* Christie	R	R	R	R	S	R	R
Leaf smut *Entyloma oryzae* H. & P. Syd.	S	S	MS	S	S	S	S
Narrow brown leaf spot *Cercospora oryzae* I. Miyake	S	MS	MS	MS	MS	S	MS
Tolerance to high pH soil (7.0 to 7.6)	Fair	--	Fair	Fair	Poor	Poor	Fair

* Reactions from Atkins (1972) and Templeton, Johnston, and Henry (1973).

row block of Labelle grown at Beaumont in 1969 was used to plant a 4 ha field for breeder seed production in 1970. Foundation seed was produced on 122 ha in 1971 and was distributed to growers in the spring of 1972 (Bollich et al. 1972).

The spikelet of Labelle is straw colored, glabrous, and awnless. It has faint anthocyanin pigmentation in the apiculus. The grain is a typical U.S. long-grain rice, slightly smaller than that of Belle Patna and 'Bluebelle' and about the same size as that of 'Starbonnet'. Labelle is similar to Belle Patna in plant type, but it has 5 to 8 cm shorter straw and slightly narrower leaves. Labelle is about the same in maturity as Belle Patna and averages 80 days from seeding to heading.

Labelle is the product of an accelerated testing and breeding program for very short season rice cultivars with resistance to the blast disease caused by *Pyricularia oryzae* Cav. Information regarding reaction to other diseases is presented in Tables 1 and 2.

Labelle has about the same first-crop yield as Belle Patna, but the second-crop yield potential is higher. It is more resistant to lodging than Belle Patna, but less so than Bluebelle. Labelle produces high milling yields and has the light hull color preferred by industrial processors of parboiled long-grain rice. Labelle possesses the superior cooking and processing behavior that characterizes U.S. long-grain varieties. Like other preferred U.S. long-grain types, it has a relatively high amylose content (24 to 25%) and an intermediate gelatinization temperature range (70 to 75 C).

Labelle was grown on about 2,300 ha in Texas in 1972. Reports from growers indicate that first-crop yields of Labelle tended to be higher than those of Belle Patna and Bluebelle, and second-crop yields were generally superior.

The initial foundation seed of Labelle contained a trace of grains with gold hulls. These offtypes have been eliminated through use of head rows in breeder seed increases. Breeder and foundation seed of Labelle are maintained by the Texas A&M University Agricultural Research and Extension Center at Beaumont, Texas.

REGISTRATION OF NORTAI RICE[1]

(Reg. No. 39)

T. H. Johnston[2], B. R. Wells[3], G. E. Templeton[4], W. F. Faw[3], and S. E. Henry[2]

'NORTAI' rice (*Oryza sativa* L.), C.I. 9836, was developed jointly by the Agricultural Research Service, USDA, and the Arkansas Agricultural Experiment Station. It was derived from the cross 'Northrose' × P.I. 215936 made at the University of Arkansas Rice Branch Experiment Station in 1959. Northrose has been registered (Johnston and Henry, 1965). P.I. 215936 ('Tainan-iku 487') is a high yielding, pubescent, short-grain introduction from Taiwan (Johnston et al., 1972).

Nortai spikelets are characteristically awnless and glabrous. There may be a few hairs on the lemma keel. The apiculus, sometimes the apex of the grains, and the outer glumes carry the purple coloring of the P.I. 215936 parent. The purple pigmentation on the panicles usually is rather pronounced at heading, but the intensity diminishes at maturity. The lemma and palea usually are light yellowish-gold in color when the grains mature. The purple coloration of Nortai distinguishes it from all other commercial rice cultivars presently grown in the United States. It was released for commercial production in March 1972 as a replacement for 'Caloro' in Arkansas (Johnston, Templeton, and Henry, 1973).

Nortai was tested under the designations C.I. 9836 and Stg 6611152. It has 25% shorter straw than Caloro and is considerably more resistant to lodging. It averages about the same in plant height as the widely grown, long-grain 'Starbonnet'. Nortai resembles Caloro in that the plants have thin culms and rather narrow, dark-green leaves. Nortai heads about 10 days later than 'Nova 66' and about 6 days earlier than Caloro from normal seeding dates. Unlike Caloro, Nortai is not photoperiod sensitive.

Nortai equalled Caloro in grain yield and exceeded it by 5% in kg/ha of milled head rice (whole kernels) in 22 replicated experiments in Arkansas during 4 years, 1969-1972. Rough rice yields of Nortai were nearly as high as, and milling yields exceeded, those of the high yielding, medium-grain cultivar, Nova 66. Percent milling yields of Nortai were almost equal to those of the excellent milling 'Nato.'

Nortai has shown greater field resistance to both blast and straighthead diseases than Caloro and has been equal to it in resistance to kernel smut in the same Arkansas tests. Nortai has surpassed both Nato and Nova 66 in field resistance to blast and kernel smut in Arkansas. Other disease reactions are presented in Tables 1 and 2.

Nortai produced an average rough rice yield of 7,030 kg/ha in 18 Arkansas variety trials, with a high average of 8,900 kg/ha in one experiment. High grain yields also were obtained in seeding rate and in nitrogen fertilizer experiments at Stuttgart. Small observational fields and seed increase fields of Nortai on rice farms in both 1971 and 1972 also produced high yields of rough rice. Data from cooperative cultural experiments show that Nortai requires higher rates of nitrogen fertilizer than Caloro and other short- or medium-grain cultivars to produce maximum grain yields.

Brown rice kernels of Nortai averaged 5.6 mm long and 2.9 mm wide, compared with corresponding measurements of 5.4 and 3.1 mm for Caloro, 5.7 and 2.6 mm for Nato, and 6.1 and 2.8 mm for Nova 66. Length/width ratios averaged 2.0, 1.8, 2.2, and 2.2 for Nortai, Caloro, Nato, and Nova 66, respectively. Nortai and Caloro are short-grain types, whereas Nato and Nova 66 are classed as medium-grain cultivars. Milled kernels of Nortai are much less chalky than those of Caloro. The two cultivars are very similar in cooking and processing characteristics, according to specific physicochemical tests conducted at the cooperative Regional Rice Quality Laboratory at Beaumont, Texas (Webb et al., 1972). Additional tests by industry representatives indicate that Nortai can be used for the same purposes as Caloro.

The original release of foundation seed contained a scattering of taller, non-purple, and otherwise different offtypes. Breeder seed panicle rows, hand picking of seed, and severe roguing of seed increase fields are being used to purify the cultivar further. Seed is produced in Arkansas under restricted certification, with only one generation each allowed for the classes registered and certified seed. Application is not being made for protection under the Plant Variety Protection Act. Breeder and foundation seed are maintained by the University of Arkansas Rice Branch Experiment Station, P. O. Box 351, Stuttgart, AR 72160.

REGISTRATION OF VISTA RICE[1]

(Reg. No. 40)

Nelson E. Jodon[2], Earl A. Sonnier[3], and W. O. McIlrath[2]

'VISTA' rice (*Oryza sativa* L.), C.I. 9628-2, was developed cooperatively at the Rice Experiment Station, Crowley, Louisiana by the Agricultural Research Service, USDA, and the Louisiana Agricultural Experiment Station. It was a selection from an apparent F_1 hybrid plant found in a 1961 headrow block of a goldhull selection from 'Rexoro' × ('Lacrosse' × 'Magnolia'). The pollen parent may have been a strawhull selection from

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[2] Research Agronomist, Southern Region, ARS, USDA, University of Arkansas Rice Branch Experiment Station, Stuttgart, AR 72160.

[3] Associate Professor, Assistant Professor, and Research Assistant, respectively, University of Arkansas Rice Branch Experiment Station.

[4] Professor of Plant Pathology, University of Arkansas, Fayetteville, AR 72701.

[1] Registered by the Crop Science Society of America. Cooperative investigations, Agricultural Research Service, USDA, and Louisiana Agricultural Experiment Station. Received September 7, 1973.

[2] Former Research Agronomist, and Research Agronomist, Southern Region, ARS, USDA, Louisiana State University Rice Experiment Station, Crowley, LA 70526.

[3] Assistant Professor, Louisiana State University Rice Experiment Station, Crowley, LA 70526.

'Nato' × 'Calrose' grown adjacently in 1960; F_2 hull color segregation was noted. The Lacrosse × Magnolia selection was a sister selection of 'Saturn' (Jodon, 1965). All the probable ancestral varieties have been described (Johnston, 1958).

Vista was released to foundation seed growers for the production of registered seed in 1971 (Jodon, Sonnier, and McIlrath, 1971). Release of the cultivar was based on its very early maturity, fertilizer responsiveness, disease resistance, and stubble crop potential. In a survey of growers in 1971, an average yield of 4,717 kg/ha from 191 ha was reported (Sonnier, 1971). More than 2,000 hectares or 1% of the Louisiana rice acreage was in Vista in 1972.

Vista is a strawhull medium-grain cultivar, as are Nato and Saturn, the current leading cultivars in Louisiana. Vista matures earlier than these main crop varieties and, as it is in the same grain type class, should fit into the marketing sequence in Louisiana better than the very short season long-grain cultivars now grown for early harvest. It is similar to 'Bluebelle' for growing period duration, but under cloudy or cool conditions it may mature more slowly.

Vista is intermediate between Bluebelle and Saturn for plant height, and the culms tend to bend rather than break in blowing rainstorms. Although it may lodge, Vista is less likely to be flattened than Saturn and is thus less subject to sprouting and deterioration of the grain in the field. In the absence of damaging storms, and where grown at the level of nitrogen fertilization usually applied to medium-grain cultivars, Vista may be less productive than Saturn. However, Vista responds to fairly high levels of nitrogen fertilization that usually result in no gain or a reduction in yield for Saturn.

In a 1970 drill strip test in which varieties were compared at a recommended and a higher rate of fertilization, Vista averaged 7,357 kg/ha with NPK at 90, 45, and 45 kg/ha, respectively, and 8,321 kg/ha with NPK at 135, 67, and 67 kg/ha, respectively. Saturn averaged 7,376 kg/ha at the lower rate but, because of severe lodging, only 6,751 kg/ha at the higher rate (McIlrath, 1970). In 1971 with the same fertilizer treatments, Vista averaged 3,925 and 5,519 kg/ha compared to 3,151 and 5,102 kg/ha for Saturn (McIlrath, 1971). In a 1971 fertilizer rate experiment Vista averaged 5,055 kg/ha with NPK at 90, 56, and 56 kg/ha and 6,064 kg/ha with NPK at 135, 56, and 56 kg/ha, respectively (Peterson and Wilson, 1971). In 1972 in a similar experiment the average was 4,909 kg/ha at the lower rate and 5,772 kg/ha at the higher rate.

Vista is non-shattering and somewhat difficult to thresh. It is said to thresh better at a lower moisture content than that at which rice is usually combined.

Vista grains averaged 8.5 mm in length; Saturn, 8.1; and Nato, 7.9. The respective average widths were 3.3, 3.4, and 3.3 mm. Vista milled kernels averaged 6.0 mm in length; Saturn, 5.7 mm; and Nato, 5.6 mm. The respective average widths were 2.7, 2.6, and 2.5 mm. Comparable grain weights were: Vista, 25.2 g/1,000 grains; Saturn, 25.0; and Nato, 23.3; Milled kernel weights were, respectively, 17.7, 16.9, and 16.5 g/1,000 kernels. Milling yields (percent whole kernels) and percent total milled rice of Vista are equal to those of Saturn and Nato. Milled rice of Vista usually is translucent and bright under Louisiana conditions.

Vista possesses considerable resistance to diseases as indicated by the data in Tables 1 and 2.

Because of vigorous regrowth, Vista has a good potential for stubble (ratoon) cropping. Its earliness allows it sufficient time to mature a second crop. The availability of a medium-grain variety with these characteristics may encourage the practice of double cropping in Louisiana.

Application is not being made for the protection of Vista under the Plant Variety Protection Act. The Rice Experiment Station, Crowley, LA 70526, will maintain breeder and foundation seed.

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REGISTRATION OF 'L-201' RICE[1]

(Reg. No. 51)

S. T. Tseng, H. L. Carnahan, C. W. Johnson, and D. M. Brandon[2]

'L-201' long grain rice (*Oryza sativa* L.), CI 9971, designated experimentally as 77-Y-46, was developed by the California Co-operative Rice Research Foundation, Inc., at the Rice Experiment Station at Biggs, Calif. It is a pure-line selection from the cross, R660, made in 1971. The pedigree is CI 9701/3/R134-1/R48-257//R50-11. F_1 plants from the first and second crosses were used for making the second and third crosses, respectively. All of the immediate parents are long grain rices. CI 9701 is an unnamed selection from the cross 'Belle Patna'/CI 9187 developed at Stuttgart, Ark., while the other parents were developed at the Rice Experiment Station at Biggs. R134-1 is a stiff-strawed, semidwarf selection from the cross 'IR8'/2*R1-7 that has lower amylose content than the typical U.S. long grain cultivars. R48-257 is a tall, large-seeded experimental from the cross K65/CI 9425-2. R50-11 is a very tall, weak-strawed experimental from the cross CI 9425-2/PI 275543, which has higher content of amylose starch than do the typical U.S. long grain cultivars. CI 9425-2 is a very short season, long grain developed at Crowley, La. from the cross 'Rexoro'/Red//Unknown. PI 275543 is an introduction from Italy.

L-201 is the first long grain rice cultivar to be released for commercial production in California. The designation "L-201" indicates that it has long grains (L), is early maturing (2) and is the first cultivar (01) released in this series. L-201 is not sensitive to photoperiod. It is 8 to 10 days earlier than the long grain rice 72/3764 (CI 11032)[3] which was released as germplasm in 1977 and which is being grown commercially on a limited acreage in California. L-201 plants average about 20 cm shorter and have more erect and darker green leaves than CI 11032; they averaged 96 cm in height, compared to 91 cm for the semidwarf cultivar, 'M9'[4]. L-201 plants are awnless, have glabrous leaves and hulls, and have anthocyanin pigmentation only in the apiculus of the grains. Seeds of L-201 are similar in size to those of CI 11032. Rough rice grains averaged 26.4 mg each in weight, 9.7 mm in length, and 2.5 mm in width compared to 9.4 and 2.6 mm for CI 11032. Brown rice kernels of L-201 averaged 7.5 mm long and 2.2 mm wide compared to 7.3 and 2.2 mm for CI 11032. The seed coat (bran) color of L-201 is light brown, the same as for other California rice cultivars.

L-201 has colorless, non-glutinous, non-aromatic endosperm with amylose starch content of 22.0 to 24.7%, as determined at the Cooperative Regional Rice Quality Laboratory at Beaumont, Tex. This is comparable to the amylose content of typical southern U. S. long grain cultivars[5]. The kernels of L-201 have intermediate to low starch gelatinization temperature as indicated by the alkali reaction of 4 to 6 when tested in a 1.7% KOH solution. White rice of L-201 grown in California cooks slightly less firm than that of southern grown, long grain cultivars but firmer than CI 11032 white rice.

Seedlings of L-201 emerge less vigorously in flooded fields than do most of the current California cultivars. However, L-201 seedlings are more vigorous in California tests than are most long grain cultivars from southern states. L-201 plants have shown moderate tolerance to sterility induced by cool temperatures at the microsporogenesis stage (about 2 weeks before heading). They were rated similar to those of the California short grain rice cultivar 'S6' in several tests for blanking tolerance.

L-201 averaged 8,550 kg/ha compared to 8,440 kg/ha at 12% moisture for the semidwarf medium grain M9 in 10 replicated combine-size-plot, state-wide yield tests conducted in 1977 and 1978. Days from heading to maturity are about 7 less for L-201 than for the current medium and short grain cultivars in California. L-201 is similar to the California semidwarf cultivars in lodging resistance. It threshes easier than other California cultivars. To enhance head rice (whole kernel) milling yields, it should be harvested at 23 to 25% moisture. Reaction of L-201 to the stem rot fungus (*Sclerotium oryzae* Catt.) is similar to that of current California cultivars.

L-201 appears to be adapted to the warmer California rice growing areas with the possible exception of areas which have highly saline and/or high pH and low Zn soils.

L-201 was released jointly by the California Co-operative Rice Research Foundation, Inc., the California Agricultural Experiment Station, and AR, SEA, USDA. It was approved for certification by the California Crop Improvement Association in 1979. Application for plant variety protection of L-201 is not being made. Classes of seed will be breeder, foundation, registered, and certified. Breeder and foundation seed of L-201 will be maintained by the California Co-operative Rice Research Foundation, Inc., P. O. Box 306, Biggs, CA 95917.

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[2] Plant breeder, Director of plant breeding, and plant breeder, California Coop. Rice Res. Found. Inc., Biggs CA 95917; and formerly extension agronomist, Dep. of Agronomy and Range Science, Univ. of California, Davis, CA 95616, currently associate professor, Rice Exp. Stn., Louisiana State Univ., P.O. Box 1429, Crowley, LA 70526.

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Registration of Crop Cultivars

REGISTRATION OF 'BOWMAN' BARLEY

'BOWMAN' barley (*Hordeum vulgare* L.) (Reg. no. 197), PI483237, was developed by the Agric. Exp. Stn., North Dakota State Univ., Fargo, ND, in cooperation with USDA-ARS and released 10 Jan. 1984. It was tested as ND4994 and traces to an F_8 reselection of an F_4 derived line from the cross, 'Klages'//'Fergus'/'Nordic'/3/ND1156/4/'Hector', made by M.K. Anderson in 1975. Nordic and ND1156 are six-rowed spring barleys and the other cultivars are two-rowed spring barleys.

Bowman is a two-rowed spring barley which has semismooth awns and long rachilla hairs. A few, < 1%, rough awned plants are present in Bowman. The covered kernels are midlong and have a white wrinkled hull and colorless aleurone. Glumes are one-half the length of the lemma, glume awns are equal to the length of the glumes, and glume hairs are long and confined to a band. The spike is medium-short, medium-lax, strap shaped, and erect prior to maturation. Bowman is medium-tall and has good spike exertion, a closed collar, and a straight neck. The leaves are waxy and dark green in color, 11 to 13 mm wide, and 20 to 26 cm long. Flag leaves are semierect at the boot stage. Bowman tillers profusely and percentage of tiller abortion is low.

Bowman heads as early as the six-rowed cv. Glenn. It forms a less dense prejointing canopy than most two-rowed spring barleys. Bowman has good tolerance to late-season lodging and post-maturity straw breakage. Straw strength consistently has been better than Hector. In 14 trials grown in North Dakota, Bowman has exceeded 'Larker' and Klages in percent plump kernels by 23 and 35% and in test weight by 8 and 9%, respectively. These advantages in plumpness and test weight were most pronounced in several trials in which severe heat and/or drought stress occurred after anthesis. Bowman has exceeded Larker and Klages in yield by 14 and 12%, respectively, in 19 North Dakota trials and 'Morex' and Hector in yield by 6 and 4%, respectively, in 16 North Dakota trials. Bowman appears to be well adapted to areas with lighter soils such as southwestern North Dakota where late-season drought and heat stress are common. Bowman has seed dormancy levels similar to those of recently released midwestern six-rowed barleys. Bowman is resistant to prevalent races of *Puccinia graminis* Pers. f. sp. *tritici* Eriks. & Henn. but is susceptible to *Puccinia hordei* Otth. It has slightly less field resistance than Glenn to *Cochliobolus sativus* (Ito & Kurib.) Drechs. ex Dast. and is equal to Glenn in resistance to *Pyrenophora teres* (Died.) Drechs. Bowman is susceptible to *Ustilago nuda* (Jens.) Rostr., *U. hordi* (Pers.) Lagerh., and barley yellow dwarf virus. Micromalt quality analyses conducted at North Dakota State University on North Dakota grown material have shown that Bowman is nearly equal to Klages in malt quality. It has a significant advantage in kernel plumpness, is equal in extract, and is lower in enzymatic activity and soluble protein. Bowman has been classified as a non-malting barley by the American Malting Barley Association.

Breeders seed will be maintained by the North Dakota Agric. Exp. Stn., Fargo, ND 58105.

J. D. FRANCKOWIAK, A. E. FOSTER, V. D. PEDERSON, AND R. E. PYLER (1)

Reference and Notes

1. Associate professor and professor, Dep. of Agronomy; professor, Dept. of Plant Pathology; and former associate professor, Dep. of Cereal Science and Food Technology, respectively, North Dakota State Univ., Fargo, ND 58105. Published with the approval of the Director of the North Dakota Agric. Exp. Stn. as Journal Article no. 1394. Registration by the Crop Sci. Soc. Am. Accepted 2 Apr. 1985.

REGISTRATION OF 'LEMONT' RICE

'LEMONT' (*Oryza sativa* L.), (Reg. no. 67) PI 475833, is an early maturing, semidwarf, long-grain cultivar developed at the Texas A&M Univ. Agric. Research and Extension Center at Beaumont, TX by ARS-USDA, in cooperation with the Texas Agric. Exp. Stn., the Texas Rice Improvement Association, the Texas Rice Research Foundation, the Louisiana Agric. Exp. Stn., and the Mississippi Agric. and Forestry Exp. Stn. It was officially released 15 Feb. 1983.

Lemont was developed from a 1974 cross of 'Lebonnet' and the F_1 of the cross CI 9881/PI 331581, the same cross from which 'Bellemont' was developed. CI 9881 is a selection from the cross 'Bluebelle'//'Belle Patna'/'Dawn,' from which Lebonnet was derived. PI 331581 is a selection from the backcross Bluebelle*6/'Taichung Native 1,' made at the International Rice Research Institute, The Philippines. The selection number for Lemont is B741A1-83-3-6-5. It was entered in the Uniform Regional Nursery in 1981 with the designation RU8003043. Detailed information on Lemont has been published (1).

Lemont possesses a semidwarf plant type and in all morphological characteristics most closely resembles Bellemont among current U.S. cultivars. Grown under the same conditions, Lemont and Bellemont plant height averaged 86 and 77 cm, respectively, in 12 tests over a 2-year period at Beaumont. In the same series of tests, 'Leah' averaged

107 cm in height. Both Lemont and Bellemont are similar in plant type to the short stature cultivar Leah, developed in Louisiana. However, the flag leaves of Leah are shorter and have a blunter appearance than those of Lemont and Bellemont. The panicles of Leah tend to be positioned above the crop canopy at maturity, whereas the panicles of Lemont and Bellemont are down in the canopy and partially obscured from view. At heading and during grain filling, the tips of the flag leaves of Lemont extend 10 cm or more above the panicles that are turning down as they gain weight.

The outer surface of the leaf sheath of Lemont is green and the inner surface is colorless with a purple tinge near the base. The internodes are green on the outer surface and milky white to colorless on the inside. The pulvinus is green. The leaves are glabrous except for sparse hairs on the leaf margins. Lemont maturity is several days later than Bellemont, Leah, and Lebonnet in both dry-seeded and water-seeded cultural systems. Lemont maturity is strongly influenced by seeding date—the later the seeding date, the shorter the growing period.

Research and commercial yield results show that Lemont has excellent yield potential. Lemont produced higher yields than any check cultivars, with few exceptions, in Texas and Louisiana yield tests. The highest yield of Lemont in Texas research plots was 10,250 kg/ha at Ganado in 1984. The comparative yields of Lemont tended to be greatest in tests where yields of all cultivars generally were good, indicating that yield superiority of Lemont was best expressed when grown under good management practices and climatic conditions.

Lemont performance was outstanding in both water-seeded and drill-seeded cultural systems in 1982–1983 Louisiana tests (2, 3, 4). In an N fertilization experiment in East Carroll Parish (north Louisiana), Lemont produced a maximum yield of 12,000 kg/ha in a fertile soil that had been in soybeans 13 previous years (2). Louisiana data show that Lemont performs very well in relation to tall cultivars at suboptimum N rates but it yields much greater than tall cultivars at optimum to excessive N rates. Empirical N rate studies and plant analyses show that Lemont requires 20 to 40 kg/ha more than tall cultivars for maximum yield in Louisiana (4). An N rate of 20 to 35 kg/ha should be applied at planting in both the dry-seeded and water-seeded-drained systems, followed by 50 to 75% of the total N within 7 days before permanently flooding in Louisiana (3). A distinct advantage of Lemont, Bellemont, and to a lesser extent Leah, is that they can be fertilized for maximum economic yield with little fear of lodging but excessive high N rates should be avoided. Lemont has performed well in Arkansas tests reaching a high of 9900 kg/ha in Clay County, AR in 1981 (5).

Lemont has the ability to produce good ratoon yields when seeded reasonably early, i.e., about 1 to 15 April. In spite of earlier than normal cool temperatures in September and October, ratoon yields averaging 1500 kg/ha (12% moisture) were reported in five commercial fields totaling 126 ha of Lemont in 1983. In 1984, ratoon crop yields of Lemont in commercial fields in Texas averaged about 1800 kg/ha, with the highest reported yield 2300 kg/ha.

The spikelet of Lemont is strawcolored, smooth, and awnless. At heading, the tip of the apiculus is purple, but the color fades and is hardly distinguishable at maturity. The stigma is colorless. Grain dimensions of Lemont are similar to those of Lebonnet, but are slightly shorter, wider and thicker than Lebonnet. Average brown rice length and width measurements of Lemont grown at Beaumont in the years 1981–1983 were 7.60 and 2.28 mm, compared with 6.91 and 2.06 for Labelle, 7.70 and 2.17 for Lebonnet, 7.02 and 2.09 for Starbonnet, and 7.76 and 2.31 for Leah. Brown rice kernel weights were 21.5, 17.9, 22.4, 17.5, and 24.3 mg/kernel, respectively, for Lemont, Labelle, Lebonnet, Starbonnet, and Leah.

Whole grain milled kernel length and width measurements from samples grown at Beaumont, TX and Stuttgart, AR in 1981 were 7.26 and 2.24 mm for Lemont, 6.64 and 1.93 for Labelle, 7.19 and 2.08 for Lebonnet, 6.78 and 1.97 for Starbonnet, and 7.47 and 2.20 for Leah. Milled kernel weight averages were 21.8, 15.6, 19.5, 16.4, and 23.6 mg/kernel for Lemont, Labelle, Lebonnet, Starbonnet, and Leah, respectively.

Characteristically, whole-grain milling yields vary considerably among years and locations because they are strongly influenced and environmental factors during grain maturation, grain moisture content at harvest, by drying procedures after harvest. All available data indicate that Lemont has good to excellent milling quality. In the Regional Uniform Rice Nurseries in Texas, Arkansas, and Louisiana in 1981–1983 the average whole grain milling yield for Lemont was 63%, compared with 62, 50, 60, 57, and 61% for Bellemont, Leah, Labelle, Lebonnet, and Starbonnet, respectively. The bushel weight of Lemont is similar to that of other U.S. long-grain cultivars.

The cooking and processing qualities of Lemont are comparable to those of present long-grain cultivars grown in the Southern USA, as determined by numerous evaluation tests conducted at the Regional Rice Quality Laboratory. Results of established physicochemical tests, which collectively serve as indices of specific cooking and processing behavior of rice, were used in comparing quality of these rice cultivars. Specific tests used in these evaluations included the determinations of amylose content, reaction of whole kernels in dilute alkali (indicative of gelatinization temperature type), protein content, water uptake at 77°C, and parboil-canning stability. Chemical and physical (quality) characteristics of representative samples from Regional Uniform Rice Performance Nurseries in Texas, Louisiana, Arkansas, and Mississippi indicate that Lemont possesses the cooking and processing behavior required of U.S. long-grain rice. Lemont, like other high-quality long-grain cultivars, is characterized as a relatively high amylose (23 to 25%)-intermediate gelatinizing (70 to 75°C) type.

Lemont is resistant to the same races of the blast fungus (*Pyricularia oryzae*) as are Labelle and Lebonnet but is only moderately susceptible to races IB-49 and IC-17, to which Labelle and Lebonnet are susceptible. Lemont differs significantly from Bellemont in reaction to various races of the blast fungus and it is in this respect that the two varieties can be most readily distinguished. Both varieties have a common resistant reaction to race IH-1 and a moderately susceptible reaction to race IB-49, but Lemont is resistant to races IB-1, IB-45, IB-54, and IG-1, whereas Bellemont is susceptible or moderately susceptible to these races.

Lemont is resistant to panicle blight, moderately resistant to brown spot (caused by *Bipolaris oryzae*), moderately susceptible to narrow brown leaf spot (caused by *Cercospora oryzae*), moderately resistant to the physiological straighthead disease, and very susceptible to sheath blight (caused by *Rhizoctonia solani*). In research plots at Beaumont that were artificially inoculated with *R. solani*, susceptible semidwarf entries were damaged more severely than susceptible non-dwarf entries with the exception of the short stature variety Leah, which showed less yield reduction in inoculated plots than Lemont or Bellemont.

The principal variants, or off-types, observed in Foundation and Registered seed fields of Lemont were tall; i.e., non-semidwarf, plants numbering about 1 per 50 000 plants. The tall variants were not uniform among themselves. Most headed long after Lemont plants matured. The tall variants generally were glabrous long-grain types with a faint purple apiculus like Lemont, but some were pubescent medium-grain types with long awns, either purple or colorless. The tall variants are highly visible during the tillering stage in a Lemont field and can be rogued out with ease. Nineteen tall variants were detected in a 3.6-ha field of Lemont Breeder's seed in 1983. Since these variants were rogued out, such variants should be essentially absent from future Lemont Foundation Seed. Variants other than the tall types were extremely rare or essentially absent in Lemont fields.

Application is not being made for protection of Lemont under the Plant Variety Protection Act. Breeder and Foundation seed of Lemont will be maintained by the Texas A&M Univ. Agric. Research and Extension Center at Beaumont, TX.

C. N. BOLLICH, B. D. WEBB, M. A. MARCHETTI, AND J. E. SCOTT (6)

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REGISTRATION OF 'PECOS' RICE

'PECOS' (*Oryza sativa* L.), (Reg. no. 68) PI 476818, is an early maturing, medium-grain rice cultivar developed at the Texas A&M Univ. Agric. Research and Extension Center at Beaumont, TX by the ARS-USDA, in cooperation with the Texas Agric. Exp. Stn., the Texas Rice Improvement Association, the Texas Rice Research Foundation, the Louisiana Agric. Exp. Stn., and the Mississippi Agric. and Forestry Exp. Stn. It was officially released 1 March 1983.

Pecos is an F_9 selection from the cross CI 9545//'Gulfrose'/'Tainan-iku 487'. CI 9545 is a gold-hull, medium-grain selection with good yielding ability but atypical medium-grain quality. Tainan-iku 487 (PI 215936) is a pubescent, short-grain Ponlai cultivar introduced from Taiwan. Gulfrose is a medium-grain cultivar released in 1960 because of its resistance to hoja blanca, a viral disease. Tainan-iku 487 is in the parentage of 'Brazos' and 'Nortai', and CI 9545 is in the parentage of Brazos. The selection number of Pecos is B6337A1-Bk_2-4-3-5-2-10. It was entered in the Uniform Regional Rice Nurseries in 1974 with the designation RU7403025.

Pecos is shorter than other medium-grain cultivars currently grown in the southern United States. In the Uniform Regional Rice Nurseries at Beaumont in 1977–1981, mature plants of Pecos averaged 102 cm in height, compared with 107, 137, 123, and 109 cm, respectively, for 'Mars', 'Nato', 'Saturn', and Brazos. Pecos is more susceptible to lodging than Mars but more resistant than Nato, Saturn, and Brazos. Pecos has lodged more severely in the water-seeded cultural system than in the dry-seeded system.

Pecos leaves tend to be very upright and the flag leaves extend 8 to 10 cm above the panicle at heading. At maturity the flag leaves assume an ascending position and the panicles are visible above the flags. The leaves of Pecos are shorter but wider than those of Mars and smaller in all dimensions than those of Nato, Saturn, and Brazos. The leaves are glabrous. Pecos heads 2 or 3 days earlier than other Southern USA current medium-grain cultivars.

The spikelet of Pecos is awnless, glabrous, and gold in color. The gold-colored hull is the principal distinguishing character of Pecos; all other medium-grain cultivars in the United States have straw-colored hulls. The apiculus is dark purple, with the purple extending onto the apex of the spikelet. The outer glumes are deep purple during grain filling, with the color fading somewhat at maturity. The stigma is deep purple.

Average brown rice length and width measurements for Pecos, Nato, Brazos, and Mars grown at Beaumont in 1982 and 1984 were 5.86 and 2.52, 5.68 and 2.42, 6.18 and 2.52, and 6.25 and 2.42 mm, respectively, and kernel weights 21.2, 18.3, 22.4, and 20.5 mg/kernel, respectively. Whole grain milled kernel length and width measurements were 5.54 and 2.57 mm for Pecos, 5.31 and 2.42 for Nato, 5.81 and 2.58 for Brazos, and 5.67 and 2.36 for Mars. Milled kernel weights averaged 19.2, 16.8, 20.2, and 18.5 mg/kernel for Pecos, Nato, Brazos, and Mars, respectively. The whole grain milling yield of Pecos averages about the same as that of Mars, above that of Brazos, and below that of Nato. Pecos kernels are inherently translucent and generally free of chalk.

Pecos has yielding ability superior to that of Nato and equal to that of Mars and Brazos. In the 11-year period 1974–1984, the average yield of Pecos, Mars, Brazos, and Nato in the Regional Uniform Rice Nurseries in Texas, Louisiana, Arkansas, and Mississippi was 6664, 6758, 6650, and 5605 kg/ha, respectively. In nine tests across the Texas rice area in 1984, the average yield of Pecos, Mars, and Brazos was 8994, 8960, and 9086 kg/ha, respectively. Pecos is similar to Mars in being more difficult to thresh than Brazos and Nato.

The cooking and processing qualities of Pecos are comparable to those of present medium-grain cultivars grown in the South, as determined by numerous evaluation tests conducted at the Regional Rice Quality Laboratory. Specific tests used in these evaluations included determinations of amylose content, reaction of whole kernels in dilute alkali (indicative of gelatinization temperature type), protein content, water uptake at 77°C, and parboil-canning stability. The data indicate that Pecos possesses the cooking and processing behavior required of U.S. medium-grain rice. Pecos, like other high-quality medium-grain cultivars, is characterized as a relatively low amylose (16 to 19%)-low gelatinizing (65 to 68°C) type.

Pecos is rated moderately susceptible to all races of the blast fungus (*Pyricularia oryzae*) that occur in the southern USA. However, it appears to have a level of field or general

REGISTRATION OF 'SUNRUNNER' PEANUT

THE 'SUNRUNNER' peanut (*Arachis hypogaea* L. subsp. *hypogaea*, var. *hypogaea*), (Reg. no. 29) was developed by the Florida Agricultural Experiment Station and released in 1982. It was tested experimentally as UF75102 and F519. Sunrunner was derived from a cross made in 1966 between a component line of 'Florunner' (UF439-16-10-1-1) (5) and an experimental Virginia-type line (UF393-7-1). The male parent (UF393-7-1), selected from a 1951 cross between a 'Florispan Runner' (1) derivative (UF334A-3-5-5-1) and 'Jenkins Jumbo' (2), has a runner growth habit and large Virginia market-type pods and seed. Pedigree selection was practiced among and within F_2 through F_6 generation plants and plant rows for growth habit, reproductive traits, uniform size and shape of pods and seed, disease resistance, and chemical quality.

Sunrunner is a multiline cultivar formed from compositing three sister lines (F519-9, F519-10, and F519-11). It is similar to Florunner in maturity, disease and insect resistance, growth habit, leaf color, leaf size, and other physical characteristics. In replicated performance trials conducted at two locations in Florida during the period 1974 to 1981, Sunrunner yields were 6% higher than Florunner for the first 3 yrs, and averaged 3% higher over the 8 yr period (3, 4). The pods and seed of Sunrunner are slightly larger than those of Florunner. Using farmer's stock market-grade standards, Sunrunner averaged 18% fancy pods, 29% extra large seed, and 63 g/100 seed, compared with 12, 25%, and 62 g/100, respectively, for Florunner. Sunrunner and Florunner are similar for the grade components, other seed, sound splits, shelling percentage, damaged seed, and total sound mature seed. Both cultivars are characterized by a high shelling percentage (80%) and a low percent seed damage (0.3% visible and 0.2% concealed). In additional shelling tests conducted by the National Peanut Research Laboratory, Dawson, GA (J.I. Davidson, 1984, personal communication), bulk density, pod shape, hull thickness, milling quality, and seed count of Sunrunner and Florunner were approximately the same. However, Sunrunner was superior to Florunner for shelling efficiency in the first stage sheller (72 vs. 62%), outturn of premium seed, and in seed shape uniformity.

The average iodine value of Sunrunner (91.9) was slightly lower than Florunner (94.9), an indication that products from Sunrunner may have a longer shelf-life. The oil percentage and oleic:linoleic ratios were similar for the two cultivars, with a 6 yr mean of 50.6 and 51.2% oil, and 2.3 and 2.1 linoleic:oleic ratio for Sunrunner and Florunner, respectively. Total protein content of Sunrunner (443 mg g^{-1}) was slightly higher than Florunner (406mg g^{-1}). The essential amino acids, methionine and lysine, were also higher in Sunrunner. Sunrunner had 4.8 mg g^{-1} methionine and 15.6 mg g^{-1} lysine, vs. 4.3 and 14.5 mg g^{-1}, respectively, for Florunner. Sunrunner was equal to or better than Florunner in flavor and blanchability.

Sunrunner is adapted to the same environments and production practices as Florunner. Inquiries concerning the availability of Sunrunner foundation seed should be addressed to the Florida Foundation Seed Producers, P.O. Box 309, Greenwood, FL 32443. Breeder seed of the three component lines will be maintained by the University of Florida, Department of Agronomy, 304 Newell Hall, Gainesville, FL 32611.

A. J. NORDEN, D. W. GORBET, AND D. A. KNAUFT (6)

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REGISTRATION OF 'TEBONNET' RICE

'TEBONNET' rice (*Oryza sativa* L.), (Reg. no. 70), PI 487195 a very-short-season, high-yielding, long-grain cultivar, was developed jointly by the Arkansas Agricultural Experiment Station and the USDA-ARS. It was officially released 17 Sept. 1984, by the Agricultural Experiment Stations of the University of Arkansas, Fayetteville; the University of Florida, Gainesville; Mississippi State University, Mississippi State; the University of Missouri, Columbia; and by USDA-ARS.

Tebonnet was tested in the Arkansas Rice Performance Test and the Regional Uniform Rice Nursery during the 6-yr-period, 1978 to 1983, under the designation RU7801011. Data have previously been reported on Tebonnet by Kuenzel et al. (6), Huey and Kuenzel (2), and McKenzie et al. (7).

Tebonnet was derived from the cross 'Bonnet 73'/CI9841 (Cross no. 72SF25-1) made at the Rice Research and Extension Center, Stuttgart, AR, in 1972. Early evaluation was made under the experimental designation STG 75VS4259 starting with F_5 seed from the 1975 panicle row VS4259. Bonnet 73 was described by Johnston et al. (5). CI9841 is a high-yielding line from the cross 'Vegold'/CI9556//'Dawn'. Vegold was described by Johnston and Adair (3). The long-grain parent CI9556 is from the cross CI9453/CI9187. CI9453 is a medium-grain sister selection of 'Nova' (4). CI9187 is a high-yielding long-grain selection which was also in the parentage of Bonnet 73. Dawn, a blast-resistant, long-grain cultivar, which has been widely used in crosses, was described by Bollich et al. (1).

Tebonnet, with an average rough rice grain yield of 6596 kg ha^{-1} produced 5% higher grain yields than 'Lebonnet' in 45 Arkansas and Cooperative Regional Uniform Nursery Tests conducted in Arkansas, Louisiana, Mississippi, and Texas, from 1978 to 1983. Data from 29 Arkansas tests during the same period showed that Tebonnet's average yield of 6821 kg ha^{-1} compared favorably with Lebonnet's at 6731 kg ha^{-1}. When compared with 'Labelle' in tests conducted from 1981 to 1983, Tebonnet produced a 10% higher yield in 18 Arkansas tests (7067 kg ha^{-1} vs. 6394 kg ha^{-1}) and in 25 Cooperative Regional Uniform Nursery tests (6978 kg ha^{-1} compared to 6361 kg ha^{-1}).

Tebonnet matures approximately 6 days earlier than Lebonnet and 3 days later than 'Bond' and Labelle. Plant heights of Tebonnet, Labelle, Lebonnet, and Bond are respectively, 109, 108, 106, and 92 cm. Tebonnet plants have a more erect plant type and sturdier straw than Labelle

and Lebonnet, rating a 4 on a relative straw strength (lodging) scale (0 = erect, 9 = flat) compared to a 5 and 6 for Labelle and Lebonnet, respectively. Tebonnet has glabrous lemma, palea and leaf blades, and grains may have colorless or purple apiculi on the lemma. At maturity, the hulls are straw colored.

Tebonnet is slightly more tolerant to sheath blight, caused by *Rhizoctonia solani* Kuhn, than Bond, Labelle, or Lebonnet, normally rating a 7 in artificially inoculated tests on a disease scale of 0 = immune, 9 = maximum disease, while the latter three cultivars rate an 8 or more. Tebonnet plants rated a 1, 5, and 7 to international rice blast (*Pyricularia oryzae* Cavara) races IH-1, IG-1 and IC-17, respectively. Tebonnet, which rated 6 on the disease scale for straighthead (a physiological disorder), requires special water management when grown on straighthead susceptible soils.

Total milled rice yields of Tebonnet averaged approximately 1 percentage point higher than those of Bond, Labelle and Lebonnet. Whole kernel milled rice yields of Tebonnet exceeded those of Labelle and Lebonnet by approximately 1 and 4 percentage points, respectively.

Individual kernel dimensions for Tebonnet, Labelle, Lebonnet, and 'Newbonnet' averaged as follows: for rough rice, length—9.5, 9.3, 10.0, and 9.4 mm; width—2.5, 2.5, 2.6, and 2.5 mm; length/width ratio—3.8, 3.7, 3.9, and 3.8; and thickness—1.9, 1.9, 2.0, and 1.9 mm. Corresponding brown rice measurements averaged: length—7.3, 7.2, 7.7, and 7.3 mm; width—2.1, 2.1, 2.2, and 2.1 mm; length/width ratio—3.5, 3.4, 3.5, and 3.4; and thickness—1.7, 1.6, 1.7, and 1.7 mm. For whole-grain milled rice the averages were: length—7.0, 7.0, 7.3, and 7.2 mm; width—2.0, 2.0, 2.1, and 2.1 mm; length/width ratio—3.5, 3.5, 3.5 and 3.5; and thickness—1.7, 1.6, 1.7, and 1.7 mm.

Average individual kernel weights for Tebonnet, Labelle, Lebonnet, and Newbonnet, respectively, were: rough rice—24.0, 21.4, 25.7, and 23.3 mg; brown rice—20.1, 17.2, 21.0, and 18.9 mg; and for milled rice—18.8, 16.2, 19.3, and 18.1 mg. These values indicate that Tebonnet and Newbonnet kernels are comparable in size, both being slightly larger than those of 'Starbonnet', a standard long-grain variety.

Kernels of Tebonnet are nonglutinous, nonaromatic, and normally free of chalk. The pericarp is light brown. Results from the Cooperative Regional Rice Quality Laboratory at Beaumont, TX, indicate that Tebonnet, with an average starch amylose content of 22.9%, and an intermediate gelatinization temperature as indicated by a 1.7% KOH spreading reaction of 2 to 5, has typical U.S. long-grain quality characteristics as described by Webb et al. (8).

A carefully rogued 0.5 ha seed increase of RU7801011 planted at Stuttgart, AR, in 1982, from hand-picked seed, produced the breeder seed used to plant the 16 ha foundation seed production field at Stuttgart in 1983. In 1983, 5000 breeder seed panicle rows were grown along with a 0.5 ha increase block to produce the breeder seed source for the 31 ha foundation seed field grown at Stuttgart, AR, in 1984. Forty-nine panicle rows were selected and approximately 100 panicles were saved from each to grow in family blocks for further purification and increase of Tebonnet breeder seed in 1984. Twenty-three families with phenotypically similar characteristics were bulked for production of further purified breeder and foundation seed in 1985 and 1986. Although the seed increases have been rogued many times, a few taller plants and/or later plants as well as possible gold-hull-, intermediate-, and/or medium-grain and other off type plants, still may be encountered.

Breeder and foundation seed of Tebonnet will be maintained by the University of Arkansas Rice Research and Extension Center, P.O. Box 351, Stuttgart, AR 72160.

Plans are being made to submit application for registration and variety protection of Tebonnet under Public Law 91-577 with the certification option.

K. A. KUENZEL, T. H. JOHNSTON, F. N. LEE, B. R. WELLS, S. E. HENRY, AND R. H. DILDAY (9)

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REGISTRATION OF 'OKER' SAFFLOWER

'OKER' safflower (*Carthamus tinctorius* L.) (Reg. no. 10) was developed at the Eastern Agricultural Research Center, Montana Agricultural Experiment Station, Sidney, MT, and released in 1984.

Oker originated from the cross Sidney Selection 87-42-3/AC-1. Sidney Selection 87-42-3 is a 1965 selection resistant to Alternaria leaf spot, incited by *Alternaria carthami* (Chow). This selection was made from the 1964 bulk composite of 555 safflower introductions from the 1960 world safflower collection. The 1964 bulk composite was grown on a lower Yellowstone River Valley site near Sidney, MT, that had been continuously cropped to safflower since 1961. The AC-1 is a high seed oil content cultivar with a purple-striped hull developed by Anderson Clayton Company, Phoenix, AZ.

The initial cross was made in 1973. Field selection for early flowering, early ripening, and disease resistance to Alternaria leaf spot and bacterial blight, incited by *Pseudomonas syringae* (Van Hall), was practiced at Sidney during the F_2 and F_3 generations. Oker is an individual F_9 plant selection derived from an early maturing disease resistant F_3 plant selected in 1975. It was subsequently tested in Montana and North Dakota yield trials as 80B2793-2.

Oker is an early flowering, early ripening variety with resistance to Alternaria leaf spot and bacterial blight. The seeds have a predominantly purple-striped hull with an occasional white normal hull (1/100). The flowers are yellow in the bud and full bloom stages. When wilted, the flower color is light orange, except under high moisture or high humidity conditions the color appears orange to light red. Oker plants are spiny and average 1 day earlier in flowering

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REGISTRATION OF 'KATY' RICE

'KATY' (*Oryza sativa* L.) (Reg. no. 78, PI 527707) is a rice blast (*Pyricularia oryzae* Cav.) resistant, midseason, high yielding, long grain cultivar developed cooperatively by the Arkansas Agricultural Experiment Station and the USDA-ARS. It was officially released in 1989 by the Agricultural Experiment Stations of the University of Arkansas, the University of Florida, Louisiana State University, Mississippi State University, the University of Missouri, and by the USDA-ARS.

Katy originated from the cross 'Bonnet 73'/CI9722//'Starbonnet'/'Tetep'/3/'Lebonnet' (cross no. 79SG30) made at the Rice Research and Extension Center, Stuttgart, AR, in 1979. Bonnet 73, Starbonnet, and Lebonnet have been previously described (4,5,2). CI9722 is a short-strawed Starbonnet selection made at Stuttgart, AR. Tetep (PI 280682) is a plant introduction from Vietnam. The experimental designation for early evaluation was STG83L1830 starting with F_5 seed from the 1983 panicle row L1830. Katy was tested in the Arkansas Rice Performance Trials and the Cooperative Regional Uniform Rice Nursery (1986–1988) under the experimental designation RU8601179.

Katy has resistance to the eight international rice blast races for which it has been evaluated. On a disease rating scale of 0 = immune and 9 = maximum disease, Katy rated 2, 1, 2, 1, 1, 1, 1, and 1 for Races IB-1, IB-45, IB-49, IB-54, IC-17, ID-13, IH-1, and IG-1, respectively. Katy is slightly more tolerant to sheath blight (*Rhizoctonia solani* Kuhn) than other southern long-grain cultivars and rates a 5 in artificially inoculated tests. 'Newbonnet' (3) and 'Lemont' (1) rate a 6 and 8, respectively. Katy rates a 6 on the disease scale for straighthead (a physiological disorder) and requires special water management when grown on straighthead susceptible soils.

Rough rice grain yields of Katy, Newbonnet, and Lemont averaged 6968, 7115, and 7358 kg ha^{-1} (120 g kg^{-1} or 12% moisture), respectively, in 30 Arkansas and Cooperative Regional Uniform Rice Nursery tests conducted in Arkansas, Louisiana, Mississippi, and Texas from 1985 to 1988. Data from 21 Arkansas tests during the same period showed that Katy's average grain yield of 7359 kg ha^{-1} compared favorably with those of Newbonnet and Lemont at 7348 and 7543 kg ha^{-1}, respectively.

Katy has the same maturity as Newbonnet and Lemont, approximately 130 d in Arkansas. Plant height for Katy and Newbonnet averaged 113 and 110 cm, respectively. Plants of Katy are similar in color to Starbonnet, but they have more erect leaves and greater straw strength. On a relative straw strength (lodging) scale (0 = erect, 9 = flat) Katy, Newbonnet, and Starbonnet rate a 3, 2, and 4, respectively. Katy has glabrous lemma, palea, and leaf blades. Grains may have colorless or purple apiculi and awns on the lemma at maturity. The hulls are straw colored. Occasionally, culms of Katy will have purple internodes, but usually they are green in color.

Milling yields (mg g^{-1} whole kernel:mg g^{-1} total milled rice) at 120 mg g^{-1} moisture for Katy, Newbonnet, and Lemont from 1984 to 1988 averaged 594:705, 623:713, and 579:727, respectively. Individual kernel dimensions for Katy, Starbonnet, and Newbonnet, respectively, averaged as follows for rough rice: length—9.3, 9.1, and 9.4 mm; width—2.4, 2.5, and 2.5 mm; length/width ratio—3.9, 3.7, and 3.8; and thickness—1.9, 1.9, and 1.9 mm. Corresponding brown rice measurements averaged as follows: length—7.2, 7.1, and 7.3 mm; width—2.1, 2.1, and 2.1 mm; length/width ratio—3.5, 3.3, and 3.5; and thickness—1.6, 1.6, and 1.7 mm. The averages were as follows for whole kernel milled rice: length—6.7, 6.9, and 7.2 mm; width—2.0, 2.1, and 2.1 mm; length/width ratio—3.3, 3.3, and 3.5; and thickness—1.6, 1.6, and 1.7 mm. Average individual kernel weights for Katy, Starbonnet, and Newbonnet, respectively, were as follows: rough rice—20.8, 20.9, and 23.3 mg; brown rice—16.9, 16.9, and 18.9 mg; and milled rice—15.7, 15.9, and 18.1 mg. Kernel dimensions and weights indicate that Katy kernels are comparable in size to those of Starbonnet.

The endosperm of Katy kernels is nonglutinous, nonaromatic, and covered by a light brown pericarp. Results from the Cooperative Regional Rice Quality Laboratory at Beaumont, TX indicate that Katy has typical U.S. long-grain rice quality characteristics as described by Webb et al. (6). Katy has an average starch amylose content of 227 g kg^{-1} and an intermediate gelatinization temperature (70–75 °C) as indicated by an average 17 g kg^{-1}KOH spreading reaction of 2.8.

Breeder seed used to establish the 16 hectare foundation seed field in 1988 came from a bulk of 134 panicle rows selected from the 1700 panicle rows grown in 1987. The 134 selected panicle rows were also grown in family blocks during 1988, and 120 blocks were selected and harvested in bulk to produce future breeder seed. The field of Katy was rogued several times throughout the season. A few taller, shorter, earlier, and/or later plants as well as a possible gold-hulled, medium, intermediate and/or very long-grain and other off-type plants may still be encountered in the variety.

Breeder and foundation seed of Katy will be maintained by the University of Arkansas Rice Research and Extension Center, P.O. Box 351, Stuttgart, AR 72160.

Application for plant variety protection of Katy is not being made.

K. A. K. MOLDENHAUER,* F. N. LEE, R. J. NORMAN, R. S. HELMS, B. R. WELLS, R. H. DILDAY, P. C. ROHMAN, AND M. A. MARCHETTI. (7)

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7. K.A.K. Moldenhauer, F.N. Lee, R.J. Norman, and P.C. Rohman. Univ. of Arkansas Rice Res. and Ext. Ctr., P.O. Box 351, Stuttgart, AR 72160; B.R. Wells, Dep. of Agronomy, Univ. of Arkansas, Fayetteville, AR 72701; R.S. Helms, Univ. of Arkansas, Southeast Res. and Ext. Ctr. Monticello, AR 71655; R.H. Dilday, USDA-ARS, Stuttgart, AR 72160; and M.A. Marchetti, USDA-ARS, Beaumont, TX 77706. Research supported in part by funds from the Arkansas Rice Research Board. Approved for publication by the director of the Arkansas Agric. Exp. Stn. Project ARK-1046. Registration by CSSA. Accepted 30 Sept. 1989. *Corresponding author.

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EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued (*7 U.S.C. 2421*). The information is held confidential until the certificate is issued (*7 U.S.C. 2426*).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
University of Arkansas Agricultural Experiment Station	RU9901030	Ahrent
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country)	**5. TELEPHONE** (Include area code)	**6. FAX** (Include area code)
AFLS Building Room E108 University of Arkansas Fayetteville, AR 72701 USA	501-575-4446	501-575-2401
	7. PVPO NUMBER 200200051	

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain** [X] YES [ ]

9. Is the applicant (individual or company) a U.S. National or a U.S. based company? **If no, give name of country** [X] YES [ ] NO

10. Is the applicant the original owner? [X] YES [ ] NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

[ ] YES [ ] NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

[ ] YES [ ] NO **If no, give name of country**

11. Additional explanation on ownership *(If needed, use the reverse for extra space)*:

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.